State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

DRINKING WATER BOARD MEMBERS

NEW DATE AND TIME FOR THE DRINKING WATER BOARD MEETING

SEPTEMBER 10, 2008
WEDNESDAY
NOON

AT 168 NORTH 1950 WEST, ROOM 101
SALT LAKE CITY, UTAH 84116

150 North 1950 West • Salt Lake City, UT
Mailing Address: P.O. Box 144830 • Salt Lake City, UT 84114-4830
Telephone (801) 536-4200 • Fax (801-536-4211 • T.D.D. (801) 536-4414
www.deq.utah.gov

DRINKING WATER BOARD
PACKET

SEPTEMBER 10, 2008

SALT LAKE CITY, UTAH

AGENDA

FOR THE
DRINKING WATER BOARD
MEETING

OF

SEPTEMBER 10, 2008

State of Utah
JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

DRINKING WATER BOARD MEETING

SEPTEMBER 10, 2008

12:00 p.m.

Place: DEQ's Offices
168 North 1950 West, Room 101
Salt Lake City, Utah 84116

Ken Bousfield's Cell Phone #: (80l) 674-2557

1. Call to Order – Chairman Erickson

2. Roll Call – Ken Bousfield

3. Introductions – Chairman Erickson

4. Approval of Minutes – July 11, 2008 and August 26, 2008

5. SRF/Conservation Committee Report – Vice Chairman Myron Bateman
   1) Status Report – Ken Wilde
   2) SRF Applications
      a) Elberta Water Company – Michael Grange
      b) Loa Town – Rich Peterson
      c) Manila Town – Rich Peterson
      d) Wales Town – Michael Grange
      e) Twin Creeks SSD - Ken Wilde

6. Proposed Rule Changes to R309-500 through R309-550 – Mike Georgeson

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7. Final Adoption of the Ground Water Development, Well Grout Rules R309-515-6 (3), (6) and (12) – Mike Georgeson

8. IPS Violation Points – Patti Fauver

9. Chairman's Report – Chairman Erickson

10. Directors Report
    New Rules:
    1. Distribution System Evaluations
    2. Well Grout Witnessing

11. Next Board Meeting:

    Date: November 12, 2008
    Time: 12:00 (NOON)
    Place: 168 North 1950 West, Room 101
    Salt Lake City, Utah 84115

12. Other

13. Adjourn

In compliance with the American Disabilities Act, individuals with special needs (including auxiliary communicative aids and services) should contact Brooke Baker, Office of Human Resources at: (801) 536-4412, TDD (801) 536-4424, at least five working days prior to the scheduled meeting.

AGENDA ITEM 4

APPROVAL OF THE

July 11, 2008
and the
August 26, 2008

MINUTES

MINUTES OF THE

JULY 11, 2008

DRINKING WATER BOARD MEETING

State of Utah
JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

MINUTES OF THE DRINKING WATER BOARD MEETING HELD ON JULY 11, 2008 IN CEDAR CITY, UTAH

Board Members Present

Anne Erickson, Chairman
Myron Bateman, Vice Chairman
Daniel Fleming
Jay Franson
Helen Graber, Ph.D.
Paul Franson
Rick Sprott
David Stevens, Ph.D.
Ron Thompson

Board Members Excused

Ken Bassett
Petra Rust

Staff

Karin Tatum
Rich Peterson
Michael Grange
Mike Georgeson
Linda Matulich

Guests

Craig Spitler, Sky View WS
Misty Thomas, Sky View WS
John Chartier, P.E., DEQ District Engineer
R. Scott Wilson, Central Iron County WCD
Doug Nielsen, Sunrise Engineering
Kelly Crane, Nolte Associates
Rod Mills, Nolte Associates
Karl Heaton, Kane County WCD
George Mason, Central Iron County WCD
Vern Steel, Rural Water Association
Curtis Ludvigson, Rural Water Association
Carolynn Salar, Sky View WS
LaWitz Hadley, Sky View WS
Curtis Nelson, Sky View WS
Larry Brough, Enoch City
Rick Wixom, Springdale City
Pat Cluff, Springdale City
Kcris Hunter, Rural Water Association
Dustyn Shaffer, Sunrise Engineering
Jeff Hoyt, Kane County Water
Jamie Carpenter, St. George City
Barry Barnum, St. George City
Wes Jenkins, St. George City
Scott Taylor, St. George City

ITEM 1 – CALL TO ORDER

The Drinking Water Board convened in Cedar City, Utah with Chairman Erickson presiding. The meeting was called to order at 9:05 a.m.

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ITEM 2 – ROLL CALL

Chairman Erickson asked Karin Tatum to call roll of the Board members. The roll call showed there were 9 members present.

ITEM 3 – INTRODUCTIONS

Chairman Erickson welcomed everyone and asked the guests to introduce themselves.

ITEM 4 – APPROVAL OF MINUTES – MAY 9, 2008 AND JUNE 6, 2008

Chairman Erickson stated a motion was in order to approve the May 9, 2008 minutes.

David Stevens moved to approve the May 9, 2008 minutes.

Jay Franson seconded.

Seven approved the minutes.

Two abstained.

CARRIED

Chairman Erickson stated a motion was in order to approve the June 6, 2008 minutes.

Danny Fleming moved to approve the June 6, 2008 minutes.

Paul Hansen seconded.

CARRIED
(Unanimous)

ITEM 5 – FOUR DAY WORK WEEK

Michael Grange addressed the Board on the new 4 day 10 hour work week that was just initiated by Governor Huntsman. A letter went out to 3,000 entities that are involved with the Division of Drinking Water on the new 4 day work schedule.

Michael mentioned that most of the State offices will be open Monday through Thursday from 7 am to 6 pm. The State offices will be closed on Fridays.

The Division of Drinking Water had a staff meeting on the day that the Governor made the announcement. Ken Bousfield and the managers acknowledged employees and requested that employees propose a schedule that would meet their needs as well as insure that the office is covered.

Michael mentioned that a calendar was enclosed in the packet showing available days for September's and November's DW Board meeting. Staff is requesting the Board review the calendar and decide what day and time they would like to hold the Drinking Water Board meeting.

Discussion followed.

Jay Franson moved the Board hold the next two Drinking Water Board meetings on September 10, 2008 and November 12, 2008 starting at 12:00 p.m. (Noon). The Board will decide at the November 12, 2008 Board meeting whether or not to keep the Board meeting on the second Wednesday of the month at 12:00 (Noon).

Myron Bateman seconded.

CARRIED
(Unanimous)

ITEM 6 – SRF/CONSEVATION COMMITTEE REPORT

1) Status Report – Karin Tatum

Karin Tatum reported the Board has a total of $3.5 million available in the State Loan Fund program which does not include the grant that we are scheduled to receive in the next few weeks.

Karin mentioned in the Federal Loan Fund program, we are actually in the negative. Staff closed Logan City's $3,000,000 loan about 3 weeks. Last week staff started working on the $5,000,000 loan.

Ron Thompson joined the Board meeting.

2) Project Priority Report – Karin Tatum

Karin mentioned staff is adding 3 projects to the Project Priority List; Sky View (Central Iron Valley), Springville, and Enoch are asking the Drinking Water Board to approve the 3 applications and add them to the Project Priority List.

Jay Franson moved to approve Sky View, Springville and Enoch to the Project Priority List.

Anne Erickson seconded.

CARRIED
(Unanimous)

3) State Revolving Fund (SRF)

a) Enoch City – Karin Tatum

Karin Tatum reported Enoch City's total project cost is about $2,500,000. The City is planning on contributing $500,000 to the project. Some of the items were added at the last minute to their request. Karin went over the additional information.

Larry Brough, Enoch City's representative, addressed the Board.

Discussion followed.

Ron Thompson moved the Board authorize a $1,910,000 construction loan to Enoch City at 2.33% interest for 20 years, with the condition that they resolve all the issues in their compliance report.

Jay Franson seconded.

CARRIED
(Unanimous)

b) Springdale Town – Michael Grange

Michael Grange reported Springdale Town's is requesting $2,769,000 in financial assistance to construct a new 1,000,000 storage tank and install a new distribution pipeline. The total cost for the project is $2,969,000. Springdale is contributing $200,000 to the project. Michael reviewed Springdale's information.

Michael mentioned staff is requesting the Board authorize a $2,000,000 construction loan at 1.00% for 30 years and a $769,000 hardship grant, to construct a new water tank and install a new culinary water distribution pipeline.

Rick Wixom and Pat Cliff, representing Springdale, addressed the Board.

Discussion followed.

Ron Thompson moved the Board authorize a $2,000,000 construction loan at 1.00% for 30 years and a $769,000 hardship grant, to the Town of Springdale, to construct a new water tank and install a new culinary water distribution pipeline.

Discussion on motion.

Danny Fleming seconded.

CARRIED
(Unanimous)

c) Grouse Creek Water Company – Michael Grange

Michael Grange reported Grouse Creek Water Company is requesting $560,000 to rehabilitate an existing well, build a well house and rehabilitate an existing spring.

Grouse Creek's MAGI is $24,517 qualifying them for Principal Forgiveness. Their average monthly water bill is currently $25.75 a month. Their request to the Board consists of a 50% loan and a 50% principal forgiveness.

Staff is recommending $560,000 construction loan with $280,000 in principal forgiveness and the remaining $280,000 at 0.00% for 30 years, to rehabilitate an existing well, construct a well house, and rehabilitate spring with the condition that they resolve all the issues in their compliance report. A 1% loan origination fee of $2,800 will be assessed, which either may be added to the authorized loan amount or paid by the community from their own funds at loan closing.

Discussion followed.

Ron Thompson moved the Board authorize a $560,000 construction loan with $280,000 in principal forgiveness and the remaining $280,000 at 0.00% for 30 years with the condition they resolve all the issues in their compliance report. A 1% loan origination fee of $2,800 will be assessed, which either may be added to the authorized loan amount or paid by the community at loan closing.

Paul Hansen seconded.

CARRIED
(Unanimous)

d) Kane County WCD – Swain's Creek – Karin Tatum

Karin Tatum reported Kane County WCD – Swain's Creek has $600,000 in their budget. Kane County is requesting the Board allow them to use the $600,000 for the Long Valley Estates.

Discussion followed.

Danny Fleming moved the Board authorize the change in cope of work for Kane County Water Conservancy District to utilize any funding left over from their Swain's Creek project for planning, design and construction of the Long Valley Estates Project. Additionally, after the Board has authorized the Long Valley Estates project, the District may start using these funds immediately to start paying for planning and design expenses.

Paul Hansen seconded.

CARRIED
(Unanimous)

e) Kane County WCD – Long Valley Estates – Karin Tatum

Karin Tatum reported the Kane County Water Conservancy District – Swain's Creek is requesting a change in the scope of work. They will complete the project with nearly $600,000 remaining in their budget. They would like to utilize the $600,000 towards a portion of the Long Valley Estates project. Long Valley Estates is No. 8 on the Top 25 Not Approved Water Systems list in the State of Utah.

Discussion followed.

Ron Thompson moved the Board authorize a $1,025,000 loan for 20-years at 2.82% with a 1% loan origination fee, that they resolve other issues as set forth by staff.

Danny Fleming seconded.

CARRIED
(Unanimous)

f) CICWCD Phase II – Karin Tatum

Karin Tatum reported Central Iron County WCD is requesting a change in the scope of work for their Phase II project. They would like to apply the $200,000 under their project cost. They would like to put the savings towards the Sky View Subdivision project. Sky View is #1 on the Top 25 Not Approved Water Systems list in the State of Utah.

Discussion followed.

Danny Fleming moved the Board authorize the change in scope of work for Central Iron County eater Conservancy District to utilize any funding left over from the Phase II Project for the Planning, Design and Construction of the Sky View Subdivision project. After the Board authorized the Sky View Subdivision project, the District may start using these funds immediately to start paying for planning and design expenses for the Sky View subdivision project.

Paul Hansen seconded.

CARRIED
(Unanimous)

g) CICWCD Sky View Subdivision – Karin Tatum

Karin Tatum reported Central Iron Country Water Conservancy District is requesting $430,000 in financial assistance to construct a 17,500 L.F. of 8" distribution main, fire hydrants and new service laterals with meters for the Sky View Subdivision. Sky View Subdivision is in the top 25 worst water systems in the State of Utah.

Karin mentioned that Misty Thomas, Sky View Subdivision resident, has been paying most of the Subdivisions bills out of her own pocket for the Sky View Subdivision.

A Sky View Subdivision resident addressed the Board.

Misty Thomas, a Sky View Subdivision representative, addressed the Board.

Discussion followed.

Paul Hansen moved the Board authorize a $430,000 hardship grant to Central Iron County Water District with the condition that CICWCD resolves all the issues in Sky View Subdivision Water System's compliance report.

Helen Graber seconded.

CARRIED
(Unanimous)

h) Pine Meadow Mutual Water – Change in Scope of Work – Karin Tatum

Karin Tatum reported Pine Meadow Mutual Water is requesting a change in the scope of work for their project. Pine Meadow Mutual has received some good bids and has been very effective in managing the project and as a result has saved approximately $600,000 from their original budget. PMMWC would like to add a 54' x 54'maintenance building utilizing their savings. The cost for the building is approximately $600,000

Anne Erickson moved the Drinking Water Board authorize a change in the scope of work for Pine Meadow Mutual Water Company to construct the maintenance buildin

David Stevens seconded.

CARRIED
(Unanimous)

i) Garden City – Rich Peterson

Rich Peterson mentioned the Board previously authorized $2,700,000 loan to Garden City in 4 previous requests. Garden City received a planning advance of $33,000. Garden City has some concerns on the planning advance they received from the DW Board recently, and therefore, they are asking for some clarification regarding the planning advance.

Discussion followed.

Ron Thompson moved the Board authorize the repayment of the 2002 planning advance be waived.

Jay Franson seconded.

CARRIED
(Unanimous)

ITEM 7 – GROUND WATER RULES R309-515-6 (3), (6) AND (12) WELL GROUT AUTHORIZATION

Chairman Erickson welcomed Mike Georgeson back to the Division.

Mike Georgeson mentioned Ying-Ying asked him to come back and finish up some work on the Ground Water Rules and Well Grout Authorization.

Mike reported on the information in the packet on the changes that have been made in the Rule. In April and June, the Division sent the information to the Water Well Drillers and Engineers who work with the Division and who the Division works with as well.

Mike mentioned staff received some comments on the revisions to the rule. The Board members were sent a copy of the comments last week. Mike reviewed the comments staff received.

Mike mentioned staff is recommending the Board revise the proposed rules as they would feel necessary and authorize staff to proceed with rulemaking or instruct staff to obtain any additional information or comments for consideration at a future Board meeting.

Discussion followed.

Ron Thompson moved the Board authorize staff to revise the proposed rules as they feel necessary, and authorize staff to proceed with rulemaking, or instruct staff to obtain any additional information or comments for consideration at a future Board meeting.

Craig Wellmaster, guest, addressed the Board.

Paul Hansen seconded.

CARRIED
(Unanimous)

ITEM 8 – STATE REVOLVING FUND (SRF) RULE REVISIONS R309-700 AND R309-705

Rich Peterson reported on the Proposed Revisions to Rule R309-700 and R309-9705. These two rules were brought to the Board last year for review. Rich reviewed what was changed and/or added in the two rules that are in the Board packet.

Discussion followed.

Rich Peterson mentioned staff is recommending review of the proposed changes to Rule R309-700 and R309-705, and if the Board reflects what is wanted, authorize staff to initiate the rulemaking process for the rule.

Ron Thompson moved the Board authorize the publication of the proposed rule changes to R309-700 and R309-705.

Myron Bateman seconded.

CARRIED
(Unanimous)

ITEM 9 – ST. GEORGE CITY ARSENIC EXEMPTION EXTENSION

Rich Peterson mentioned St. George is requesting the Drinking Water Board approve an Arsenic exemption extension to comply with the new Arsenic Standard for drinking water. St. George City's current extension expires in January 2009.

Rich mentioned St. George City is over the limit of 30,000 residents living in their community, thus making St. George City ineligible for an exemption.

Discussion followed.

Myron Bateman moved the Board authorize a bilateral agreement between St. George City and the State of Utah to have their Arsenic Exemption resolved by 2011 and explain what they are doing regarding their Arsenic issue.

Ron Thompson seconded.

CARRIED
(Unanimous)

ITEM 10 – WILLOW CREEK WATER COMPANY ARSENIC EXEMPTION

No report was given.

ITEM 11 – OPERATOR CERTIFICATION COMMISSION INFORMATION

Jay Franson represents the Board on the Operation Certification Commission.

Jay mentioned the Operator Certification Commission held a meeting since the last Board meeting. Jay said that Kim Dyches is doing a great job with the Operator Certification program. Utah's Operator Certification program is on known nationally. A lot of people are looking at Utah's program, and they are very supportive of our program and how we do it. We are working very well with the Rural Water Association of Utah. The Operator Certification program is working very well in the State. There are very few systems that do not have a certified operator.

Jay mentioned the Operator Certification Commission elected Mark Clark to Chair the Commission. The Operator Certification Commission elected Bart Simons to be the Vice Chair of the Commission.

Jay mentioned there are a couple of appointments that expire at the end of this year, and a couple of replacements will be looked into. The Board members will want to look at who they want to be on the Commission.

ITEM 12 – CHAIRMAN'S REPORT

Chairman Erickson thanked staff for the work they do and in helping out with the Board meetings so well.

Chairman Erickson mentioned Karin Tatum has accepted a job with EPA Region VIII in Denver, Colorado. Karin was thanked her for her hard work with the Board and the Division.

ITEM 13 – DIRECTORS REPORT

a) Conflict of Interest Forms Update

Karin Tatum mentioned there are some Conflict of Interest forms for the Board members to fill out.

A Non Conflict of Interest form was handed out at the last Board meeting for the Board to fill out if they don't have a conflict of interest.

The conflict of interest forms are for the Board members that do have a conflict of interest, and need to fill them out.

b) Henrieville Update

On behalf of Henrieville, Brett Chenoweth expressed his thanks to the Board for their assistance to the Town. He also reported in a June 17, 2008 telephone call to Ken Bousfield that the project as complete, and they were in the process of disinfecting the line prior to placing it into service.

c) Rural Water Conference of Northern Utah

If the Board members are interested in attending the conference, let Linda know and she can get the Board members registered.

ITEM 14 – NEXT BOARD MEETING

Chairman Erickson reported the next Board meeting will be on September 10, 2008, at Noon. The meeting will be at 168 North 1950 West, Room 101, Salt Lake City, Utah.

ITEM 15 – OTHER

No other business.

ITEM 16 – ADJOURN

Chairman Erickson stated a motion to adjourn the Board meeting was in order.

A motion was made to adjourn the Drinking Water Board meeting.

The motion was seconded.

CARRIED
(Unanimous)

Linda Matulich
Recording Secretary

MINUTES OF THE

AUGUST 26, 2008

DRINKING WATER BOARD

TELECONFERENCE MEETING

State of Utah
JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

MINUTES OF THE DRINKING WATER BOARD TELECONFERENCE MEETING HELD ON AUGUST 26, 2008 IN SALT LAKE CITY, UTAH

Board Members Present

Anne Erickson, Chairman
Myron Bateman, Vice Chairman
Ken Bassett
Daniel Fleming
Jay Franson
Petra Rust
Rick Sprott
David Stevens, Ph.D.
Ron Thompson

Staff

Ken Bousfield
Ken Wilde
Michael Grange
Linda Matulich

Guests

Gary Uresk, Woods Cross City, Manager

Board Members Excused

Helen Graber, Ph.D.

ITEM 1 – CALL TO ORDER

The Drinking Water Board Teleconference meeting convened in Salt Lake City, Utah with Chairman Erickson presiding. The meeting was called to order at 1:15 p.m.

ITEM 2 – ROLL CALL

Chairman Erickson asked Ken Bousfield to call roll of the Board members. The roll call showed there were 9 members present.

ITEM 3 – INTRODUCTIONS

Chairman Erickson welcomed everyone and asked the guests to introduce themselves.

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ITEM 4 – SRF/CONSERVATION COMMITTEE REPORT – Vice Chairman Myron Bateman

1) Woods Cross Construction Project

Michael Grange reported Woods Cross City received a 20 year loan of $5,000,000 at .349% interest at the November 16, 2007 Drinking Water Board meeting. Woods Cross City is requesting an additional amount of $600,000 to cover higher than expected project bid amounts.

Michael Grange updated the Board on Woods Cross City's project and the reason for their request.

Discussion followed.

Myron Bateman moved the Board authorize an additional $600,000 in construction assistance to the City of Woods Cross at the same terms and conditions outlined in the authorization letter dated May 2, 2008 and addressed to Mayor Kent Perry of Woods Cross City. Total construction assistance funding for the Woods Cross City drinking water system improvement project will be $5,000 program

Ron Thompson seconded.

CARRIED
(Unanimous)

ITEM 5 – NEXT BOARD MEETING

Chairman Erickson reported the next Board meeting will be on September 10, 2008 at Noon. The meeting will be at 168 North 1950 West, Room 101, Salt Lake City, Utah.

ITEM 6 – OTHER

Ken Bousfield briefed the Board on the Rural Water Association of Utah's Northern Conference.

ITEM 7 – ADJOURN

Chairman Erickson stated a motion to adjourn the Board meeting at 1:30 p.m. was in order.

A motion was made to adjourn the Drinking Water Board meeting.

The motion was seconded.

Linda Matulich
Recording Secretary

AGENDA ITEM 5

SRF/CONSERVATION COMMITTEE REPORT

SRF/CONSERVATION COMMITTEE REPORT

5. 1) STATUS REPORT – Ken Wilde

DIVISION OF DRINKING WATER

STATE LOAN FUNDS

AS OF JULY 31, 2008

	Total State Fund:	$10,066,214	
	Total State Hardship Fund:	$2,629,260	
	Subtotal:	$12,695,474	
LESS AUTHORIZED	Less:		
	Authorized Loans:	$9,834,000	*(see Page 2 for details)*
	Authorized Hardship:	$1,647,146	
	Subtotal:	$11,481,146	
	Total available after Authorized deducted	**$1,214,328**	
PROPOSED	**Proposed Loan Project(s):**	**$0**	*(see Page 2 for details)*
	Proposed Hardship Project(s):	**$0**	
	Subtotal:	**$0**	
AS OF:			
July 31, 2008	**TOTAL REMAINING STATE LOAN FUNDS:**	**$232,214**	
	TOTAL REMAINING STATE HARDSHIP FUNDS:	**$982,114**	

Total Balance of ALL Funds: **$1,214,328**

Projected Receipts Next Twelve Months:			
and Sales Tax Revenue			
Annual Maximum Sales Tax Projection	**$3,587,500**		
Less State Match for 2008 & 2009 Federal	($3,258,400)		
Less Administration Fees	($138,600)		
SUBTOTAL Sales Tax Revenue including adjustments:		$190,500	
Payment:			
Interest on Investments (Both Loan and Hardship Accounts)		$420,000	
Principal payments		$2,896,610	**Receive 90% in January**
Interest on payments		$743,828	
Total Projections:		$4,250,938	

Total Estimated State SRF Funds Available through 7-31-2009:	**$5,465,266**

DIVISION OF DRINKING WATER
STATE LOAN FUNDS
PROJECTS AUTHORIZED BUT NOT YET FUNDED
AS OF JULY 31, 2008

Community	Loan #	Cost Estimate	Date Authorized	Date Closed/Anticipated	Authorized Funding Loan	Grant	Total
Garden City 2.31% 20 yr*	3S048	2,700,000	Sep-02	Aug-08	$946,000		$946,000
Bear River 2.19% 20 yr	3S096	2,880,000	Sep-07	Aug-08	1,818,000	600,000	2,418,000
Escalante 2.46% 30 yr	3S104	2,160,896	Mar-07	Sep-08	1,560,000	600,896	2,160,896
Parowan 2.05% 20 yr	3S111	2,137,000	Jan-08	Sep-08	1,923,000		1,923,000
Howell Town 3.13% 20 yr	3S116	95,000	May-08	Sep-08	95,000		95,000
Springdale w/hs grant $769,000	3S118	2,769,000	Jul-08	Sep-08	2,000,000		2,000,000
KCWCD-Long Valley Estates	3S119	4,580,950	Jul-08	Oct-08	1,025,000		1,025,000
West Erda 0% 20 yr	3S074	760,000	Jun-04	?	380,000	380,000	760,000
							0
Subtotal Loans and Grants Authorized					9,747,000	1,580,896	11,327,896
PLANNING LOANS/GRANTS							
Enterprise (planning loan 0% 5 yr)	3S092	7,000	May-06	Jan-07	7,000		7,000
Wellington (pl loan 2% 5 yr)	3S104	40,000	Mar-07	Sep-07	40,000		40,000
Wales Town (pl 0% 5yr)	3S112	40,000	Jan-08		40,000		40,000
Paragonah planning grant	3S110	16,250	Sep-07	Mar-08		16,250	16,250
Town of Alta planning grant	3S113	50,000	Jan-08			50,000	50,000
Subtotal Planning Loans/Grants Auth					87,000	66,250	153,250
Total authorized but not yet funded					$9,834,000	$1,647,146	$11,481,146
PROPOSED PROJECTS							
Loa Town	3S121	37,000					
Wales Town	3S120	460,000					
Total Proposed Projects					0	0	0
				Closed date			
Recently Closed:							
Springdale planning grant	3S117	19,000	May-08	Jul-08		19,000	19,000
Henrieville emergency grant	3S114	100,000	Feb-08	Jul-08		100,000	100,000

*Garden City is in the processing of closing. $1,500,000 warrant has been drawn, but closing is pending due to some loose ends.

DIVISION OF DRINKING WATER
FEDERAL SRF
AS OF July 31, 2008

1997 thru 2007 SRF Grants	
Net Federal SRF Grants:	$73,905,366
Total State Matches:	$18,358,700
Closed Loans:	-$90,626,684
Total Grant Dollars:	**$1,637,382**

Principal Repayments	
Principle (P):	$13,650,317
Interest (I):	$1,533,703
Total P & I:	**$15,184,020**

Earnings on Invested Cash Balance	
Total:	**$1,065,816**

Hardship Fund	
Total:	**$2,629,132**

SUMMARY		
Total Federal First Round Fund:	$1,637,382	
Total Federal Second Round Fund:	$16,249,835	
Total Federal Hardship Fund:	$2,629,132	
Subtotal:	$20,516,350	
LESS AUTHORIZED		
Less:		
Authorized Federal 1st Round:	$11,096,000	*(see Page 2 for details)*
Authorized Federal 2nd Round:	$8,335,312	
Authorized Federal Hardship:	$1,643,918	
Subtotal:	$21,075,230	
PROPOSED		
Proposed Federal 1st Round Project(s):	**$0**	*(see Page 2 for details)*
Proposed Federal 2nd Round Project(s):	**$0**	
Proposed Federal Hardship Project(s):	**$0**	
Subtotal:	**$0**	
AS OF:		
July 31, 2008		
TOTAL REMAINING FIRST ROUND FUNDS:	**-$9,458,618**	
TOTAL REMAINING SECOND ROUND FUNDS:	**$7,914,524**	
TOTAL REMAINING HARDSHIP FUNDS:	**$985,214**	

Total Balance of ALL Funds: **-$558,880**

Projected Receipts Next Twelve Months:		
Payment:		
2008 Fed SRF Grant	$6,516,800	
State 20% Match for FY 2008	$1,629,200	
2009 Fed SRF Grant	$6,516,800	
State 20% Match for FY 2009	$1,629,200	
Interest on Investments	$531,600	
Principal payments	$3,109,000	
Interest	$741,343	**Receive 90% in January**
Hardship fees	$607,437	
Total:	$21,281,379	

Total Estimated Federal SRF Funds Available through 7-31-2009: $20,722,499

DIVISION OF DRINKING WATER
FEDERAL SRF
PROJECTS AUTHORIZED BUT NOT YET CLOSED
AS OF JULY 31, 2008

COMMUNITY	Project			Authorized Date	Closing Date Scheduled	Authorized From Loan Funds (1st Round)			Authorized From Loan Funds (2nd Round)	Hardship Fund
	Total	Terms	Loan #			Loan	Forgiveness	Total	Loan	
Mountain Regional Water	3,026,263	2.0% int, 20 yrs	3F076	Feb-08	Sep-08	3,026,000		3,026,000	0	
Greenwich WWC	320,000	0%, 20 yrs	3F070	Jul-07	Sep-08			0	111,000	110,300
Woods Cross	5,000,000	1%, 20 yrs	3F072	Nov-07	Sep-08	5,000,000		5,000,000	0	
Erda Acres	2,620,000	0% 30 yrs	3F064	Nov-07	Sep-08	2,120,000	500,000	2,620,000	0	
St George	15,000,000	1.77% int 20 yrs	3F047	Mar-05	Oct-08			0	6,000,000	
Twin Creeks #2	1,200,000	0% int 30 yrs	3F028	Apr-03	Deauth?	360,000	90,000	450,000		
Springdale w/st loan of $2 mil	2,769,000	hs grant	3F118	Jul-08				0		769,000
Enoch	2,500,000	2.33% int 20 yrs	3F081	Jul-08				0	1,910,000	
Central Iron Valley (Skyview)	430,000	hs grant	3F080	Jul-08				0		430,000
East Grouse Creek Pipeline	556,000	0%, 30 yrs	3F077	Jul-08				0	280,000	280,000
					TOTAL CONSTRUCTION AUTHORIZED:	$ 10,506,000	$ 590,000	$ 11,096,000	$8,301,000	$ 1,589,300
PLANNING ADVANCES/OTHER AUTHORIZED:										
Beaver Dam Water	20,000	planning loan	3F062	May-06	Dec-07			0	4,312	
Leeds Domestic WUA	15,000	planning loan	3F066	Mar-07	Apr-08			0	15,000	
Pinon Forest SSD	15,000	planning loan	3F073	Oct-07	May-08			0	15,000	
Rural Water Assn of UT	111,744	Grant	*	Oct-07	Jan-08			0	0	54,618
					TOTAL PLANNING AUTHORIZED:	$0		$0	$34,312	$54,618
					TOTAL AUTHORIZED CONSTRUCTION & PLANNING:			$11,096,000	$8,335,312	$1,643,918
PROPOSED PROJECTS FOR SEPT 2008:										
Mountain Valley Water ??	718,000	2.78% int 20 yrs						0		
					TOTAL PROPOSED PROJECTS FOR THIS MEETING:	$0		$0	$0	$0
					TOTAL PROPOSED PROJECTS:			$0	$0	$0
*RWAU hardship grant is being disbursed monthly										
RECENT LOAN CLOSINGS:										
Logan #3	9,545,000	0.8% int 20 yrs	3F052	May-05	Jun-08	3,000,000		3,000,000		
Midvale	10,000,000	2% int, 20 yrs	3F069	Jul-07	Jul-08	5,050,000		5,050,000	0	
Total Recent Loan Closings						$8,050,000	$0	$8,050,000	$0	
					AVAILABLE PROJECT FUNDS (1st Round less Authorized):					-$9,456,618
					AVAILABLE PROJECT FUNDS (2nd Round less Authorized):					$7,914,524
					AVAILABLE PROJECT FUNDS (Hardship less Authorized):					$985,214
					TOTAL FUNDS AFTER PROPOSED PROJECTS ARE FUNDED (1st Round):					-$9,456,618
					TOTAL FUNDS AFTER PROPOSED PROJECTS ARE FUNDED (2nd Round):					$7,914,524
					TOTAL FUNDS AFTER PROPOSED PROJECTS ARE FUNDED (Hardship):					$985,214

SRF/CONSERVATION COMMITTEE REPORT

5. 2) SRF APPLICATIONS

a) Elberta Water Company – Michael Grange

DRINKING WATER BOARD
BOARD PACKET FOR PLANNING ADVANCE
INTRODUCTION TO DRINKING WATER BOARD

APPLICANT'S REQUEST:

The Elberta Water Company is requesting an $18,000 Planning Advance to prepare a water system master plan and perform a water system study to investigate system capacity in five major areas including, water rights, source capacity, storage capacity, distribution system capacity, and water treatment. The study will also identify what options are available for Elberta to comply with arsenic regulations.

STAFF COMMENTS & RECOMMENDATIONS:

The local MAGI for the area served by the Elberta Water Company is $32,894, or 89% of the State MAGI. Their average monthly water bill is $32.54, or 1.19% of local MAGI.

It is proposed that the SRF Committee recommend that the Drinking Water Board approve the proposed $18,000 planning grant to the Elberta Water Company. The planning advance will allow the Water Company to prepare a water system master plan and perform a water system study to investigate system capacity in five major areas including; water rights, source capacity, storage capacity, distribution system capacity, and water treatment. The study will also identify what options are available for Elberta to comply with arsenic regulations.

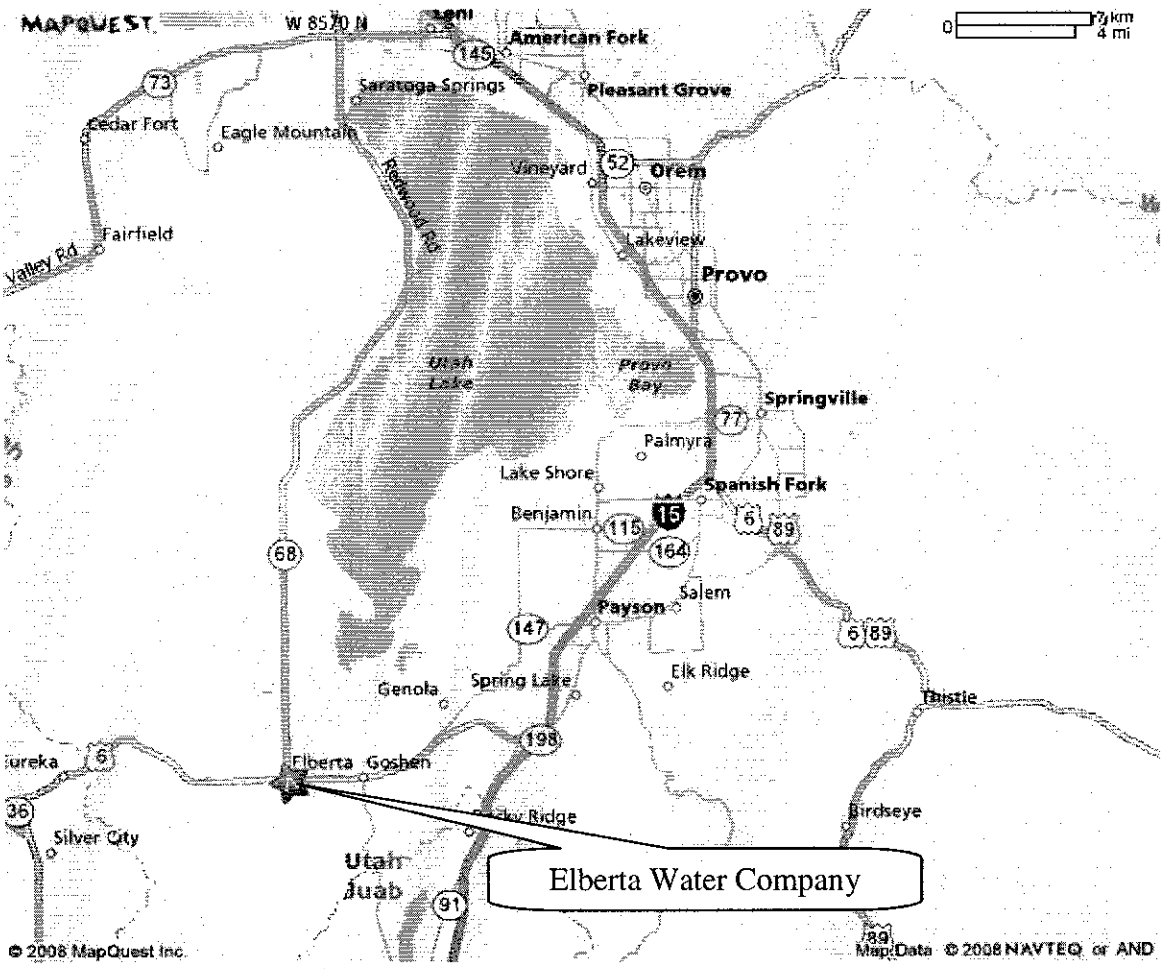
SRF CONSERVATION COMMITTEE RECOMMENDATION:

The Drinking Water Board authorize an $18,000 planning loan at 0.0% interest for 5 years to the Elberta Water Company.

APPLICANT'S LOCATION:

Elberta is located in Utah County, approximately 23 miles southwest of Provo.

MAP OF APPLICANT'S LOCATION:



SCOPE OF WORK:

The project scope of work includes preparing a water system master plan and performing a water system study to investigate system capacity in five major areas including, water rights, source capacity, storage capacity, distribution system capacity, and water treatment. The study will also identify what options are available for Elberta to comply with arsenic regulations.

POPULATION GROWTH:

There is no growth rate data specifically for the Town of Elberta, however, according to the Governor's Office of Planning and Budget, Utah County (outside of the Provo/Orem area and growth areas such as Eagle Mountain and Saratoga Springs) is projected to experience negative growth. Based on this projection Staff has elected to keep the population and number of connections for Elberta constant throughout the life of the project

	Year	Population	ERC's
Current:	2007	206	64
Projected:	2015	206	64

IMPLEMENTATION SCHEDULE:

Apply to DWB for Planning Funds:	July 2008
SRF Committee Conference Call:	August 2008
DWB Funding Authorization:	September 2008
Complete Master Plan/Study:	November 2008

COST ESTIMATE:

Master Plan/Water Study:	$18,000.00
Total Planning Cost:	$18,000.00

COST ALLOCATION:

The cost allocation proposed for the project is shown below.

Funding Source	Cost Sharing	Percent of Project
DWB Loan	$18,000.00	100%
Total Amount:	$18,000.00	100%

SPECIAL CONDITIONS:

1. Complete all items as stated in the Engineering Agreement between Elberta Water Company and Sunrise Engineering, Inc.

APPLICANT:	Elberta Water Company PO Box 121 Elberta, Utah 84626 Telephone: (801)473-1136
PRESIDING OFFICIAL & CONTACT PERSON:	Bill Ford, President PO Box 121 Elberta, Utah 84626 Telephone: (801)473-1136
CONSULTING ENGINEER:	Jacob Sharp Sunrise Engineering, Inc. 25 E 500 N Fillmore, Utah 84631 Telephone: (435)743-6151
BOND ATTORNEY:	None Appointed
FINANCIAL CONSULTANT:	None Appointed

SRF/CONSERVATION COMMITTEE REPORT

5. 2) SRF APPLICATIONS

b) Loa Town – Rich Peterson

DRINKING WATER BOARD
BOARD PACKET FOR CONSTRUCTION LOAN
PRESENTED TO THE DRINKING WATER BOARD

APPLICANT'S REQUEST AND STAFF COMMENTS:

The Town of Loa is requesting a grant of $37,000 to replace a service line that has cost the Town a substantial amount of money in repairs each year. Total project cost is $38,000 and Loa is contributing $1,000 to the project.

The local MAGI is $33,401, which is 90% of the State MAGI of $36,960. Based on the local MAGI, and projected expenses, their resulting water bill would be $24.48 per month (0.88% of local MAGI). The Town, therefore, does not qualify for grant funds. They currently have a water bill of approximately $21.69 per month. The Town is planning to raise rates in the near future.

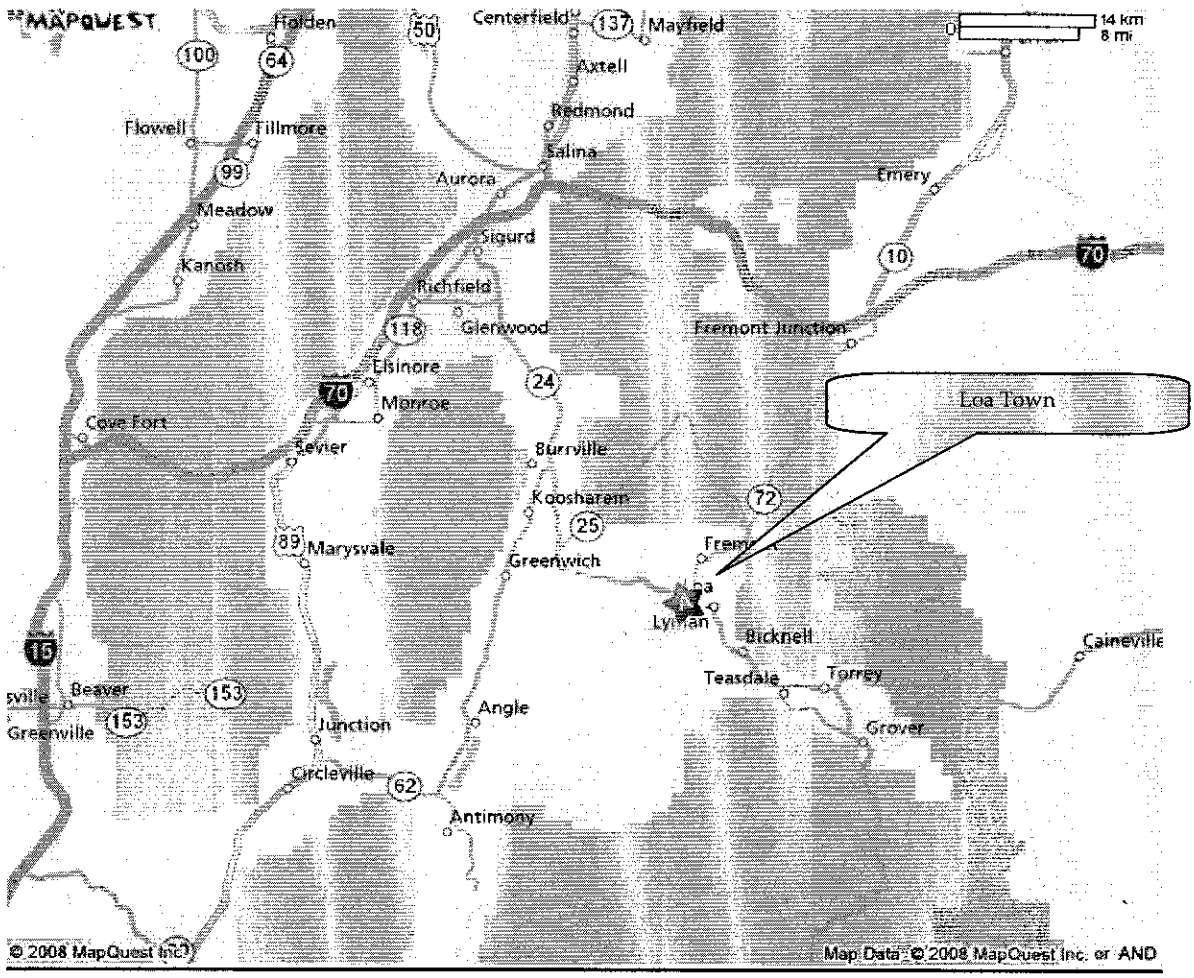
SRF CONSERVATION COMITTEE RECOMMENDATION:

The Drinking Water Board authorize a $37,000 construction loan at 2.21% for 10 years to Loa Town, contingent on resolving the appropriate concerns on their compliance report. The loan origination fee would be $370.

APPLICANT'S LOCATION:

Loan Town is located in Wayne County, approximately 45 miles south of Richfield, Utah.

MAP OF APPLICANT'S LOCATION:



PROJECT DESCRIPTION:

Construction of a 3730-ft service line to replace an existing line with significant leakage and contamination potential.

ALTERNATIVES EVALUATED:

Because of the reoccurring costs each year dealing with repairs of this service line, the Town feels that the "No Action" alternative is not an acceptable solution. Replacing the waterline is the best alternative.

POPULATION GROWTH:

According to the Governor's Office of Planning and Budget, Loa Town is expected to grow at an average annual rate of change of 4.27% through 2030.

	Year	Population	ERC's
Current	2008	490	319
Projected	2030	810	415

IMPLEMENTATION SCHEDULE:

Apply to DWB for Funding:	August 2008
DWB Funding Authorization:	9/12/2008
Plans Designed:	COMPLETE
Plan Approval:	8/25/2008
Advertise for Bids:	8/29/2008
Bid Opening:	9/15/2008
Loan Closing:	9/22/2008
Begin Construction:	9/24/2008
Complete Construction:	10/10/2008
DDW Operating Permit:	10/14/2008

COST ESTIMATE:

Construction:	$30,600
Engineering:	$2,800
Contingency:	$4,200
Total Capital Cost:	$37,800

COST ALLOCATION:

The cost allocation proposed for the project is shown below.

Funding Source	Cost Sharing	Percent of Project
DWB Loan (2.21%, 10 yrs)	$37,000	97.37%
Loa	$1,000	2.63%
Total Amount:	$38,000	100.00%

ESTIMATED ANNUAL COST OF WATER SERVICE:

See Financial Assistance Evaluation Spreadsheet.

SPECIAL CONDITIONS:

1. Complete all items as specified in the engineering agreement between Loa and the selected consulting engineer.

2. Address all items as outlined in Loa's Compliance Report.

CONTACT INFORMATION:

APPLICANT:	Loa Town 80 West Center Loa, UT 84747 435-836-2160
PRESIDING OFFICIAL & CONTACT PERSON:	Jeff Olsen, Mayor 80 West Center Loa, UT 84747 435-836-2160
CONSULTING ENGINEER:	Richard White EarthFax Engineering, Inc. 7324 South Union Park Ave., Suite 100 Midvale, UT 84047 801-561-1555

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Loa
COUNTY: Wayne
PROJECT DESCRIPTION: replace water line

FUNDING SOURCE: State SRF

100 % Loan & 0 % Grant

ESTIMATED POPULATION:	490	NO. OF CONNECTIONS:	319	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$21.69 *			PROJECT TOTAL:	$38,000
CURRENT % OF AGI:	0.78%	FINANCIAL PTS:	57	LOAN AMOUNT:	$37,000
ESTIMATED MEDIAN AGI:	$33,401			GRANT AMOUNT:	$0
STATE AGI:	$36,960			TOTAL REQUEST:	$37,000
SYSTEM % OF STATE AGI:	90%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.20%		AFTER REPAYMENT PENALTY & POINTS 2.21%
ASSUMED LENGTH OF DEBT, YRS:	10	10		10
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.20%		2.21%
REQUIRED DEBT SERVICE:	$3,700.00	$4,838.32		$4,164.47
*PARTIAL COVERAGE (15%):	$0.00	$0.00		$0.00
*ADD. COVERAGE AND RESERVE (10%):	$370.00	$483.83		$416.45
ANNUAL DEBT PER CONNECTION:	$12.76	$16.68		$14.36
O & M + FUNDED DEPRECIATION:	$58,275.00	$58,275.00		$58,275.00
OTHER DEBT + COVERAGE:	$31,250.00	$31,250.00		$31,250.00
REPLACEMENT RESERVE ACCOUNT:	$5,572.00	$5,628.92		$5,595.22
NEEDED SYSTEM INCOME:	$89,097.00	$89,153.92		$89,120.22
ANNUAL O&M PER CONNECTION:	$279.30	$279.48		$279.37
AVG MONTHLY WATER BILL:	$24.34	$24.68		$24.48
% OF ADJUSTED GROSS INCOME:	0.87%	0.89%		0.88%

* Current water bill is based on 2006 Revenue & number of connections

Loa

PROPOSED BOND REPAYMENT SCHEDULE

100 % Loan & 0 % Grant

PRINCIPAL	$37,000.00	ANTICIPATED CLOSING DATE	22-Sep-08
INTEREST	2.21%	P&I PAYMT DUE	01-Jan-10
TERM	10	REVENUE BOND	
NOMIN. PAYMENT	$4,164.47	PRINC PREPAID:	$0.00

YEAR	BEGINNING BALANCE	DATE OF PAYMENT	PAYMENT		PRINCIPAL	INTEREST	ENDING BALANCE	PAYM NO.
2009	$37,000.00		$224.87	*	$0.00	$224.87	$37,000.00	0
2010	$37,000.00		$3,817.70		$3,000.00	$817.70	$34,000.00	1
2011	$34,000.00		$2,751.40		$2,000.00	$751.40	$32,000.00	2
2012	$32,000.00		$3,707.20		$3,000.00	$707.20	$29,000.00	3
2013	$29,000.00		$4,640.90		$4,000.00	$640.90	$25,000.00	4
2014	$25,000.00		$4,552.50		$4,000.00	$552.50	$21,000.00	5
2015	$21,000.00		$4,464.10		$4,000.00	$464.10	$17,000.00	6
2016	$17,000.00		$4,375.70		$4,000.00	$375.70	$13,000.00	7
2017	$13,000.00		$4,287.30		$4,000.00	$287.30	$9,000.00	8
2018	$9,000.00		$4,198.90		$4,000.00	$198.90	$5,000.00	9
2019	$5,000.00		$5,110.50		$5,000.00	$110.50	$0.00	10
			$42,131.07		$37,000.00	$5,131.07		

*Interest Only Payment

28004 Loa
Compliance Report
August 7, 2008

Administration:

No issues

Operator Certification:

No issues

Bacteriological Information:

No issues

Chemical Monitoring:

No issues

Lead/Copper:

No issues

Consumer Confidence Reports:

No issues

Physical Facilities:

No flow measuring device on discharge piping

Drinking Water Source Protection:

Loa is in compliance with Drinking Water Source Protection requirements

Plan Review:

No issues

SRF/CONSERVATION COMMITTEE REPORT

5. 2) SRF APPLICATIONS

c) Manila Town – Rich Peterson

DRINKING WATER BOARD
BOARD PACKET FOR CONSTRUCTION GRANT
PRESENTED TO THE DRINKING WATER BOARD

APPLICANT'S REQUEST AND STAFF COMMENTS:

The Town of Manila is requesting a grant of $100,000 to install an emergency SCADA system and prepare a Master plan for their recent regionalization project. The estimated cost of the SCADA installation is $68,000 and the cost for labor and the engineering study is $32,000.

The local MAGI for the Town of Manila plus the outside residents being served by the water system is estimated to be $30,625, which is 83% of the State MAGI of $36,960. They currently have a water bill of approximately $34.71 per month (1.36% of local MAGI), which nearly matches the projected water bill based on expenses (see attached Financial Evaluation spreadsheet). The Town is to be commended for their efforts in their regionalization and staff recommends that a grant be given to the Town of Manila.

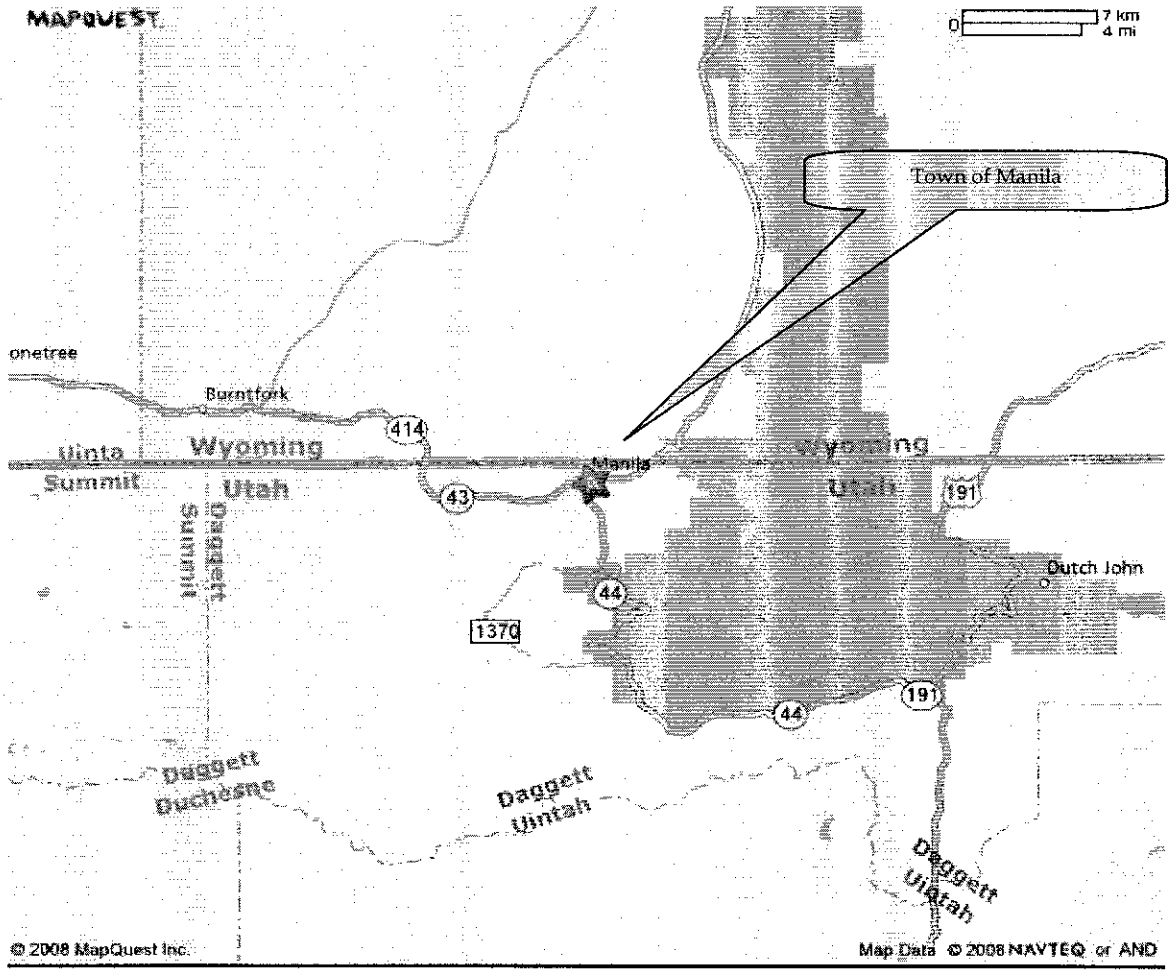
SRF CONSERVATION COMITTEE RECOMMENDATION:

The Drinking Water Board authorize a $100,000 grant to the Town of Manila, contingent on resolving the appropriate concerns on their compliance report.

APPLICANT'S LOCATION:

The Town of Manila is located in Daggett County, near the Utah/Wyoming boarder.

MAP OF APPLICANT'S LOCATION:



PROJECT DESCRIPTION:

Provide an operating SCADA system and master water plan for needed improvements to the combined Manila and Daggett County water system.

ALTERNATIVES EVALUATED:

This project is to provide a functional SCADA system for the Town of Manila to remotely manage and observe the Sols Canyon Well (8 miles from town), and six water tanks. In the most recent outage, the operator had to make numerous trips up and down

the mountain to manually trip the well back on to keep the town with water. Over a 72 hour period, he only had 12 hours of interrupted sleep.

POPULATION GROWTH:

According to the Governor's Office of Planning and Budget, Manila Town is expected to grow at an average annual rate of change of 1.81% through 2030.

IMPLEMENTATION SCHEDULE:

DWB Funding Authorization:	9/10/2008
Plans Designed:	10/15/2008
Plan Approval:	11/3/2008
Loan Closing:	11/10/2008
Begin Construction:	11/10/2008
Complete Construction:	12/1/2008
DDW Operating Permit:	12/5/2008

COST ESTIMATE:

Construction:	$68,000
Engineering/Contingency/Labor:	$32,000
Total Capital Cost:	$100,000

COST ALLOCATION:

The cost allocation proposed for the project is shown below.

Funding Source	Cost Sharing	Percent of Project
DWB Grant	$100,000	100%
Manila	-	0%
Total Amount:	$100,000	100%

ESTIMATED ANNUAL COST OF WATER SERVICE:

(see attached Financial Evaluation spreadsheet)

SPECIAL CONDITIONS:

1. Complete all items as specified in the engineering agreement between Manila and the selected consulting engineer.

2. Address all items as outlined in Manila's Compliance Report.

CONTACT INFORMATION:

APPLICANT:	Town of Manila 1st E. Hwy 43, PO Box 189 Manila,UT 84046 435-784-3143
PRESIDING OFFICIAL & CONTACT PERSON:	Chuck Dickison, Mayor 80 West Center Loa, UT 84747 435-784-3143
TREASURER:	Andrea Scott 435-784-3143 435-784-3356 fax
CONSULTING ENGINEER:	Kevin Brown Sunrise Engineering, Inc.. 122227 South Business Park Drive, Suite 220 Draper, UT 84020 801-523-0100
BOND ATTORNEY:	Eric Johnson Smith / Hartvigsen 215 South State Street Salt Lake City, UT 84111 801-413-1600 801-413-1620 fax eric@smithlawonline.com

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Manila
COUNTY: Daggett
PROJECT DESCRIPTION: SCADA & Master Plan

FUNDING SOURCE: State SRF

0 % Loan & 100 % Grant

ESTIMATED POPULATION:	2,400	NO. OF CONNECTIONS:	889	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$34.71 *			PROJECT TOTAL:	$100,000
CURRENT % OF AGI:	1.36%	FINANCIAL PTS:	62	LOAN AMOUNT:	$0
ESTIMATED MEDIAN AGI:	$30,625			GRANT AMOUNT:	$100,000
STATE AGI:	$36,960			TOTAL REQUEST:	$100,000
SYSTEM % OF STATE AGI:	83%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.20%		AFTER REPAYMENT PENALTY & POINTS 2.28%
ASSUMED LENGTH OF DEBT, YRS:	20	20		20
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.20%		2.28%
REQUIRED DEBT SERVICE:	$0.00	$0.00		$0.00
*PARTIAL COVERAGE (15%):	$0.00	$0.00		$0.00
*ADD. COVERAGE AND RESERVE (10%):	$0.00	$0.00		$0.00
ANNUAL DEBT PER CONNECTION:	$0.00	$0.00		$0.00
O & M + FUNDED DEPRECIATION:	$162,186.00	$162,186.00		$162,186.00
OTHER DEBT + COVERAGE:	$209,047.50	$209,047.50		$209,047.50
REPLACEMENT RESERVE ACCOUNT:	$25,949.85	$25,949.85		$25,949.85
NEEDED SYSTEM INCOME:	$365,183.35	$365,183.35		$365,183.35
ANNUAL O&M PER CONNECTION:	$410.78	$410.78		$410.78
AVG MONTHLY WATER BILL:	$34.23	$34.23		$34.23
% OF ADJUSTED GROSS INCOME:	1.34%	1.34%		1.34%

* Current water bill is based on 2006 Revenue & number of connections

05003 Manila
Compliance Report
February 8, 2005

Administration:

The system needs the following elements of a cross connection control program: 1) legal authority and 2) on-going enforcement

Operator Certification:

No issues

Bacteriological Information:

No issues

Chemical Monitoring:

No issues

Lead/Copper:

No issues

Consumer Confidence Report

2007 calendar year report due on July 1, 2008 has not been submitted.

Physical Facilities:

No issues

Drinking Water Source Protection:

Manila is in compliance with Drinking Water Source Protection requirement. Updates to the Sols Canyon Wells source protection plans will be due December 2010.

Plan Review:

Operating permit has not been issued for extension approved in 2005.

SRF/CONSERVATION COMMITTEE REPORT

5.) SRF APPLICATIONS

d) Wales Town – Michael Grange

DRINKING WATER BOARD
BOARD PACKET FOR CONSTRUCTION PROJECT
INTRODUCTION TO DRINKING WATER BOARD

APPLICANT'S REQUEST:

Wales Town is requesting $460,000 in financial assistance to construct a new well, new well housing and a transmission line to convey water from the well to the storage tank. The Town's existing source has experienced substantially reduced flow as a result of the continued drought in the Sanpete County area. The new well will allow the Town to meet the minimum source capacity required by Rule.

STAFF COMMENTS & RECOMMENDATIONS:

The local MAGI is $28,742, which is 77.7% of the State MAGI of $36,960, therefore, the Town qualifies for hardship grant. Based on information provided by Wales, their average total monthly water bill is currently $34.07 per month, equal to 1.42% of local MAGI. Under the proposed financing package of 50% loan and 50% hardship grant, the estimated average total water bill after project completion will be $57.12, equal to 2.38% of their local MAGI. The initial financial evaluation, a 100% loan at full interest, returned an interest rate of 3.11% over 20 years and an average water user rate of $65.03 per user per month, which is 2.72% of local MAGI. A comparison of financial evaluation results is outlined in the following table. Selected spreadsheet analyses are attached for reference.

Table 1
Average Total Monthly Water Bill per Connection
Loan / Grant Ratio approximately 50 / 50

Length of Loan	Annual Interest Rate	Monthly User Rate	% of Local MAGI
20 yrs	3.11%	$ 65.03	2.72%
	1.00%	$ 62.18	2.60%
	0.00%	$ 60.94	2.54%
30 yrs	3.11%	$ 61.34	2.56%
	1.00%	$ 58.36	2.44%
	0.00%	$ 57.12	2.38%

Wales Town has also requested that the balance of the previously authorized $40,000 planning loan be rolled into the proposed construction loan.

It is proposed that the Drinking Water Board authorize $460,000 in financial assistance to the Town of Wales consisting of a $230,000 construction loan at 0% interest for 30 years and $230,000 in grant. The financial assistance will allow Wales Town to drill a new culinary water well, construct a well house, and install a transmission line to convey

water from the well to the storage tank. The existing $40,000 planning loan will be rolled into the construction loan.

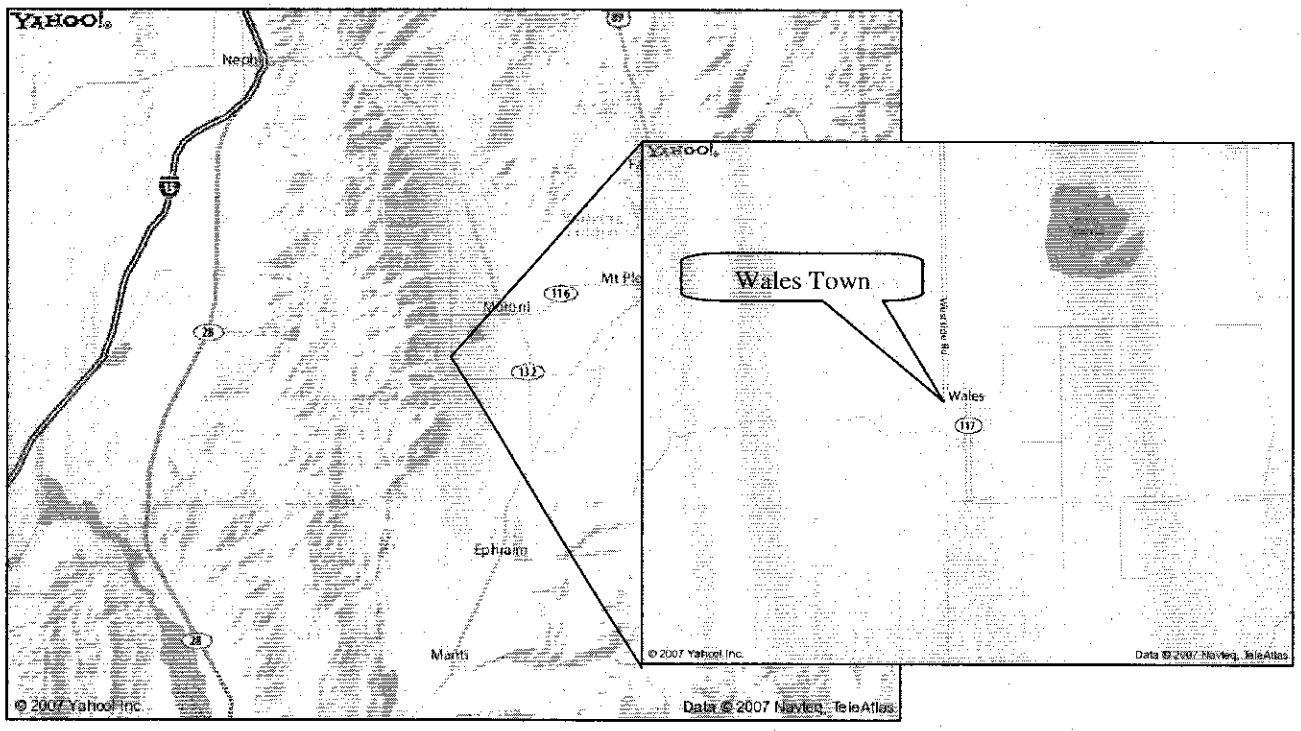
SRF CONSERVATION COMMITTEE RECOMMENDATION:

The Drinking Water Board authorize $460,000 in financial assistance to the Town of Wales consisting of a $230,000 construction loan at 0% interest for 30 years and $230,000 in grant. The financial assistance will allow Wales Town to drill a new culinary water well, construct a well house, and install a transmission line to convey water from the well to the storage tank. The existing $40,000 planning loan will be rolled into the construction loan.

APPLICANT'S LOCATION:

Wales Town is located in Sanpete County, approximately 4 miles southwest of the town of Moroni.

MAP OF APPLICANT'S LOCATION:



The project scope of work includes drilling a new culinary source water well, building a well house and installing a transmission line from the new well to the storage tank.

POPULATION GROWTH:

According to the Governor's Office of Planning and Budget, Wales Town is expected to grow at an average annual rate of change of 1.4% through the year 2030.

	Year	Population	ERC's
Current:	2007	300	113
Projected:	2030	353	133

IMPLEMENTATION SCHEDULE:

Apply to DWB for Planning Funds:	July 2008
SRF Committee Conference Call:	August 2008
DWB Funding Authorization:	September 2008
Complete Project Design:	October 2008
Receive DDW Plan Approval:	November 2008
Advertise for Bids:	November 2008
Bid Opening:	November 2008
Loan Closing:	December 2008
Begin Construction:	December 2008
Complete Construction:	January 2009
Receive DDW Operating Permit:	January 2009

COST ESTIMATE:

Legal:	$15,500.00
Administrative:	$2,500.00
Engineering:	$41,500.00
Construction:	$398,200.00
DDW Loan Origination Fee	$2,300.00
Total Planning Cost:	$460,000.00

COST ALLOCATION:

The cost allocation proposed for the project is shown below.

Funding Source	Cost Sharing	Percent of Project
DWB Loan (0.0%, 30 yrs)	$230,000.00	50%
DWB Grant	$230,000.00	50%
Total Funding Amount:	$460,000.00	100%

SPECIAL CONDITIONS:

1. Complete all items as stated in the Engineering Agreement between Wales Town and Wall Engineering.
2. Correct all issues identified in the most recent compliance report.

APPLICANT INFORMATION:

APPLICANT:	Wales Town 150 N. State Street HC 13 Box 4274 Wales, Utah 84667 Telephone: (435)436-9345
PRESIDING OFFICIAL & CONTACT PERSON:	Byron Davis, Mayor HC 13 Box 4218 Wales, Utah 84667 Telephone: (435)436-8716
CONSULTING ENGINEER:	Lynn Wall, P.E. Wall Engineering PO Box 39 Fillmore, Utah 84631 Telephone: (435)864-7503 Cell: (801) 592-3224 Email: walleng@crytstalpeaks.com
BOND ATTORNEY:	Richard Chamberlain Chamberlain Associates 225 N 100 E Richfield, Utah 84701 Telephone: (435)896-4461
FINANCIAL CONSULTANT:	None Appointed

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DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Wales
COUNTY: Sanpete
PROJECT DESCRIPTION: new well, well house, and transmission line

FUNDING SOURCE: State SRF

Loan/Grant Combination

ESTIMATED POPULATION:	300	NO. OF CONNECTIONS:	113	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$34.07 *			PROJECT TOTAL:	$500,000
CURRENT % OF AGI:	1.42%	FINANCIAL PTS:	50	LOAN AMOUNT:	$270,000
ESTIMATED MEDIAN AGI:	$28,742			GRANT AMOUNT:	$230,000
STATE AGI:	$36,960			TOTAL REQUEST:	$500,000
SYSTEM % OF STATE AGI:	78%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.20%	EQUIVALENT ANNUAL PAYMENT 0.00% **	AFTER REPAYMENT PENALTY & POINTS 0.00%
ASSUMED LENGTH OF DEBT, YRS:	30	30	30	30
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.20%	0.00%	0.00%
REQUIRED DEBT SERVICE:	$9,000.00	$17,966.33	$16,756.67	$9,000.00
*PARTIAL COVERAGE (15%):	$0.00	$0.00	$0.00	$0.00
*ADD. COVERAGE AND RESERVE (10%):	$900.00	$1,796.63	$1,675.67	$900.00
ANNUAL DEBT PER CONNECTION:	$87.61	$174.89	$163.12	$87.61
O & M + FUNDED DEPRECIATION:	$54,634.00	$54,634.00	$54,634.00	$54,634.00
OTHER DEBT + COVERAGE:	$10,660.00	$10,660.00	$10,660.00	$10,660.00
REPLACEMENT RESERVE ACCOUNT:	$4,468.90	$4,917.22	$4,856.73	$4,468.90
NEEDED SYSTEM INCOME:	$67,552.90	$68,001.22	$67,940.73	$67,552.90
ANNUAL O&M PER CONNECTION:	$597.81	$601.78	$601.25	$597.81
AVG MONTHLY WATER BILL:	$57.12	$64.72	$63.70	$57.12
% OF ADJUSTED GROSS INCOME:	2.38%	2.70%	2.66%	2.38%

* Current water bill is based on revenue & number of connections reported on application
**

Wales

PROPOSED BOND REPAYMENT SCHEDULE

Loan/Grant Combination

PRINCIPAL	$270,000.00	ANTICIPATED CLOSING DATE	01-Dec-08
INTEREST	0.00%	P&I PAYMT DUE	01-Jan-10
TERM	30	REVENUE BOND	
NOMIN. PAYMENT	$9,000.00	PRINC PREPAID:	$0.00

YEAR	BEGINNING BALANCE	DATE OF PAYMENT	PAYMENT		PRINCIPAL	INTEREST	ENDING BALANCE	PAYM NO.
2009	$270,000.00		$0.00	*	$0.00	$0.00	$270,000.00	0
2010	$270,000.00		$9,000.00		$9,000.00	$0.00	$261,000.00	1
2011	$261,000.00		$9,000.00		$9,000.00	$0.00	$252,000.00	2
2012	$252,000.00		$9,000.00		$9,000.00	$0.00	$243,000.00	3
2013	$243,000.00		$9,000.00		$9,000.00	$0.00	$234,000.00	4
2014	$234,000.00		$9,000.00		$9,000.00	$0.00	$225,000.00	5
2015	$225,000.00		$9,000.00		$9,000.00	$0.00	$216,000.00	6
2016	$216,000.00		$9,000.00		$9,000.00	$0.00	$207,000.00	7
2017	$207,000.00		$9,000.00		$9,000.00	$0.00	$198,000.00	8
2018	$198,000.00		$9,000.00		$9,000.00	$0.00	$189,000.00	9
2019	$189,000.00		$9,000.00		$9,000.00	$0.00	$180,000.00	10
2020	$180,000.00		$9,000.00		$9,000.00	$0.00	$171,000.00	11
2021	$171,000.00		$9,000.00		$9,000.00	$0.00	$162,000.00	12
2022	$162,000.00		$9,000.00		$9,000.00	$0.00	$153,000.00	13
2023	$153,000.00		$9,000.00		$9,000.00	$0.00	$144,000.00	14
2024	$144,000.00		$9,000.00		$9,000.00	$0.00	$135,000.00	15
2025	$135,000.00		$9,000.00		$9,000.00	$0.00	$126,000.00	16
2026	$126,000.00		$9,000.00		$9,000.00	$0.00	$117,000.00	17
2027	$117,000.00		$9,000.00		$9,000.00	$0.00	$108,000.00	18
2028	$108,000.00		$9,000.00		$9,000.00	$0.00	$99,000.00	19
2029	$99,000.00		$9,000.00		$9,000.00	$0.00	$90,000.00	20
2030	$90,000.00		$9,000.00		$9,000.00	$0.00	$81,000.00	21
2031	$81,000.00		$9,000.00		$9,000.00	$0.00	$72,000.00	22
2032	$72,000.00		$9,000.00		$9,000.00	$0.00	$63,000.00	23
2033	$63,000.00		$9,000.00		$9,000.00	$0.00	$54,000.00	24
2034	$54,000.00		$9,000.00		$9,000.00	$0.00	$45,000.00	25
2035	$45,000.00		$9,000.00		$9,000.00	$0.00	$36,000.00	26
2036	$36,000.00		$9,000.00		$9,000.00	$0.00	$27,000.00	27
2037	$27,000.00		$9,000.00		$9,000.00	$0.00	$18,000.00	28
2038	$18,000.00		$9,000.00		$9,000.00	$0.00	$9,000.00	29
2039	$9,000.00		$9,000.00		$9,000.00	$0.00	$0.00	30
			$270,000.00		$270,000.00	$0.00		

*Interest Only Payment

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Wales
COUNTY: Sanpete
PROJECT DESCRIPTION: new well, well house, and transmission line

FUNDING SOURCE: State SRF

Loan/Grant Combination

ESTIMATED POPULATION:	300	NO. OF CONNECTIONS:	113	SYSTEM RATING:	APPROVED
CURRENT AVG WATER BILL:	$34.07 *			PROJECT TOTAL:	$500,000
CURRENT % OF AGI:	1.42%	FINANCIAL PTS:	50	LOAN AMOUNT:	$270,000
ESTIMATED MEDIAN AGI:	$28,742			GRANT AMOUNT:	$230,000
STATE AGI:	$36,960			TOTAL REQUEST:	$500,000
SYSTEM % OF STATE AGI:	78%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.20%	EQUIVALENT ANNUAL PAYMENT 0.00% **	AFTER REPAYMENT PENALTY & POINTS 1.00%
ASSUMED LENGTH OF DEBT, YRS:	30	30	30	30
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.20%	0.00%	1.00%
REQUIRED DEBT SERVICE:	$9,000.00	$17,966.33	$16,756.67	$10,461.99
*PARTIAL COVERAGE (15%):	$0.00	$0.00	$0.00	$0.00
*ADD. COVERAGE AND RESERVE (10%):	$900.00	$1,796.63	$1,675.67	$1,046.20
ANNUAL DEBT PER CONNECTION:	$87.61	$174.89	$163.12	$101.84
O & M + FUNDED DEPRECIATION:	$54,634.00	$54,634.00	$54,634.00	$54,634.00
OTHER DEBT + COVERAGE:	$10,660.00	$10,660.00	$10,660.00	$10,660.00
REPLACEMENT RESERVE ACCOUNT:	$4,468.90	$4,917.22	$4,856.73	$4,542.00
NEEDED SYSTEM INCOME:	$67,552.90	$68,001.22	$67,940.73	$67,626.00
ANNUAL O&M PER CONNECTION:	$597.81	$601.78	$601.25	$598.46
AVG MONTHLY WATER BILL:	$57.12	$64.72	$63.70	$58.36
% OF ADJUSTED GROSS INCOME:	2.38%	2.70%	2.66%	2.44%

* Current water bill is based on revenue & number of connections reported on application
**

DRINKING WATER BOARD FINANCIAL ASSISTANCE EVALUATION

SYSTEM NAME: Wales
COUNTY: Sanpete
PROJECT DESCRIPTION: new well, well house, and transmission line

FUNDING SOURCE: State SRF

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ESTIMATED POPULATION:	300	NO. OF CONNECTIONS:	113	SYSTEM RATING:	APPROVED
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STATE AGI:	$36,960			TOTAL REQUEST:	$500,000
SYSTEM % OF STATE AGI:	78%				

	@ ZERO % RATE 0%	@ RBBI MKT RATE 5.20%	EQUIVALENT ANNUAL PAYMENT 0.00% **	AFTER REPAYMENT PENALTY & POINTS 3.11%
ASSUMED LENGTH OF DEBT, YRS:	30	30	30	30
ASSUMED NET EFFECTIVE INT. RATE:	0.00%	5.20%	0.00%	3.11%
REQUIRED DEBT SERVICE:	$9,000.00	$17,966.33	$16,756.67	$13,971.79
*PARTIAL COVERAGE (15%):	$0.00	$0.00	$0.00	$0.00
*ADD. COVERAGE AND RESERVE (10%):	$900.00	$1,796.63	$1,675.67	$1,397.18
ANNUAL DEBT PER CONNECTION:	$87.61	$174.89	$163.12	$136.01
O & M + FUNDED DEPRECIATION:	$54,634.00	$54,634.00	$54,634.00	$54,634.00
OTHER DEBT + COVERAGE:	$10,660.00	$10,660.00	$10,660.00	$10,660.00
REPLACEMENT RESERVE ACCOUNT:	$4,468.90	$4,917.22	$4,856.73	$4,717.49
NEEDED SYSTEM INCOME:	$67,552.90	$68,001.22	$67,940.73	$67,801.49
ANNUAL O&M PER CONNECTION:	$597.81	$601.78	$601.25	$600.01
AVG MONTHLY WATER BILL:	$57.12	$64.72	$63.70	$61.34
% OF ADJUSTED GROSS INCOME:	2.38%	2.70%	2.66%	2.56%

* Current water bill is based on revenue & number of connections reported on application

**

SRF/CONSERVATION COMMITTEE REPORT

5. 2) SRF APPLICATIONS

e. Twin Creeks SSD – Ken Wilde

DRINKING WATER BOARD
BOARD PACKET FOR DE-AUTHORIZATION
PRESENTED TO THE DRINKING WATER BOARD

Twin Creek Special Service District (the District) is located on the east side of and contiguous to Heber City. The District has received a loan authorization through the Federal SRF loan program to:

- Drill and equip a well that would initially serve as a backup water supply to Twin Creeks Water Treatment Plant, and
- Construct a transmission line to connect the new well to Twin Creeks Water Treatment Plant.

On April 11, 2003, the Drinking Water Board originally authorized a loan of $360,000 at zero percent interest plus a principal forgiveness of $90,000 to the District. That authorization gave the District twelve months to close the loan. Since that time limit has expired, the Division of Drinking Water (Division) sent a letter to Dan Matthews, Manager of Twin Creeks on March 26, 2008, stating they had 30 days to respond to our inquiry or the loan would be de-authorized to allow the funds to be used for a project that is ready. The Division received a telephone call from Dan Matthews stating they had decided to use another mechanism to fund their project and declined to loan and grant offered by the Board.

SRF/Conservation Committee Recommendation:

The Drinking Water Board de-authorize all funds previously authorized to Twin Creeks Special Service District so the funds may be used for other projects.

AGENDA ITEM 6

PROPOSED RULE CHANGES TO R309-500 THROUGH R309-550 – Michael Georgeson

Proposed Rule Changes to R309-500 through R309-550

Staff have reviewed current rule and found numerous errors in references to other portion of rule or simple errors such as not superscripting a number (representing a value being raised to a power). These errors are shown in red on the following pages.

STAFF RECOMMENDATION:

The Board authorizes staff to file with the Division of Administrative Rules "A Notice of Non-Substantive Rule Change" for each of the rules.

R309. Environmental Quality, Drinking Water.
R309-500. Facility Design and Operation: Plan Review, Operation and Maintenance Requirements.
R309-500-1. Purpose.

The purpose of this rule is to describe plan review procedures and requirements, clarify projects requiring review, and inspection requirements for drinking water projects. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-500-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-500-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-500-4. General.

(1) Construction and Operation of New Facilities.

As authorized in 19-4-106(3) of the Utah Code, the Executive Secretary may review plans, specifications, and other data pertinent to proposed or expanded water supply systems to insure proper design and construction.

Plans and specifications and a business plan as required by R309-800-5, along with a completed project notification form, shall be submitted to the Executive Secretary for any new water systems or previously un-reviewed water systems unless acceptable data can be presented that the proposed or existing water system will not become a "public water system" as defined in 19-4-102 of the Utah Code or in R309-110.

Construction of new facilities for public water systems or existing facilities of previously un-reviewed public drinking water systems shall conform to [~~with~~] rules R309-500 through R309-550; the "Facility Design and Operation" rules. There may be times in which the requirements of the Facility Design and Operation rules are not appropriate. Thus, the Executive Secretary may grant an "exception" to the Facility Design and Operation rules if it can be [~~br~~] shown that the granting of such an exception will not jeopardize the public health.

Construction of a public drinking water project shall not begin until complete plans and specifications have been approved in writing by the Executive Secretary unless waivers have been issued as allowed by R309-500-6(3). This approval shall be referred to as the Plan Approval.

Furthermore, no new public drinking water facility shall be

put into operation until written approval to do so has been given by the Executive Secretary or this requirement waived. This approval is referred to as the Operating Permit.

(2) Existing Facilities.

All existing public drinking water systems shall be capable of reliably delivering water which meets the minimum current standard of drinking water quantity and quality requirements. The Executive Secretary may require modification of existing systems in accordance with R309-500 through R309-550 when such modifications are needed to reliably achieve minimum quantity and quality requirements.

(3) Operation and Maintenance of Existing Facilities.

Public drinking water system facilities shall be operated and maintained in a manner which protects the public health. As a minimum, the operation and maintenance procedures of R309-500 through R309-550 shall be adhered to.

R309-500-5. Public Drinking Water Project.

(1) Definition.

A public drinking water project, requiring the submittal of a project notification form along with plans and specifications, is any of the following:

(a) The construction of any facility for a proposed drinking water system (see 19-4-106(3) of the Utah Code or R309-500-4(1) above describing the authority of the Executive Secretary).

(b) Any addition to, or modification of, the facilities of an existing public drinking water system which may affect the quality or quantity of water delivered.

(c) Any activity, other than on-going operation and maintenance procedures, which may affect the quality or quantity of water delivered by an existing public drinking water system. Such activities include:

(i) the interior re-coating or re-lining of any raw or drinking water storage tank, or water storage chamber within any treatment facility,

(ii) the "in-situ" re-lining of any pipeline,

(iii) a change or addition of any primary coagulant water treatment chemical (excluding filter, flocculent [~~floc~~] or coagulant aids) when the proposed chemical does not appear on a list of chemicals pre-approved by the Executive Secretary for a specific treatment facility, and

(iv) the re-development of any spring or well source or replacement of a well pump with one of different capacity.

(2) On-going Operation and Maintenance Procedures.

On-going operation and maintenance procedures are not considered public drinking water projects and, accordingly, are not subject to the project notification, plan approval and operating permit requirements of this rule. However, these activities shall be carried out in accordance with all operation and maintenance requirements contained in R309-500 through R309-550 and specifically the disinfection, flushing and bacteriological sampling and testing requirements of ANSI/AWWA C651-05 [~~92~~] for pipelines, ANSI/AWWA C652-02 [~~92~~] for storage facilities, and ANSI/AWWA C654-03 [~~97~~] for wells before they are

placed back into service. The following activities are considered to be on-going operation and maintenance procedures:

(a) pipeline leak repair,

(b) replacement of existing deteriorated pipeline where the new pipeline segment is the same size as the old pipeline,

(c) distribution pipeline additions where the pipeline size is the same as the main supplying the addition, the length is less than 500 feet and contiguous segments of new pipe total less than 1000 feet in any fiscal year,

(d) entry into a drinking water storage facility for the purposes of inspection, cleaning and maintenance, and

(e) replacement of equipment or pipeline appurtenances with the same type, size and rated capacity (fire hydrants, valves, pressure regulators, meters, service laterals, chemical feeders and booster pumps including deep well pumps).

R309-500-6. Plan Approval Procedure.

(1) Project Notification.

The Division shall be notified prior to the construction of any "public drinking water project" as defined in R309-500-5(1) above. The notification may be prior to or simultaneous with submission of construction plans and specifications as required by R309-500-6(2) below. Notification shall be made by the management of the regulated public water system on a form provided by the Division. Information required by this form shall be determined by the Division and may include:

(a) whether the project is for a new or existing public drinking water system,

(b) the professional engineer, registered in the State of Utah, designing the project and his/her experience designing public drinking water projects within the state,

(c) the individual(s) who will be inspecting the project during construction and whether such inspection will be full-time or part time,

(d) whether required approvals or permits from other governmental agencies (e.g. local planning commissions, building inspectors, Utah Division of Water Rights) are awaiting approval by the Executive Secretary, the agency's name and contact person,

(e) the fire marshal, fire district or other entity having legal authority to specify requirements for fire suppression in the project area,

(f) for community and non-transient non-community public water systems or any public water system treating surface water, the name of the certified operator who is, or will be, in direct responsible charge of the water system,

(g) whether the water system has a registered professional engineer employed, appointed or designated as being directly responsible for the entire system design and his or her name and whether the system is requesting waiving of plan submittal under conditions of R309-500-6 (3),

(h) the anticipated construction schedule, and

(i) a description of the type of legal entity responsible for the water system (i.e. corporation, political subdivision, mutual ownership, individual ownership, etc.) and the status of

the entity with respect to the rules of the Utah Public Service Commission.

(2) Pre-Construction Requirements.

All of the following shall be accomplished before construction of any public drinking water project commences:

(a) Contract documents, plans and specifications for a public drinking water project shall be submitted to the Division at least 30 days prior to the date on which action is desired unless the system is eligible for and has requested waiving of plan submittal. Any submittal shall include engineering reports, pipe network hydraulic analyses, water consumption data, supporting information, evidence of rights-of-way and reference to any previously submitted master plans pertinent to the project, along with a description of a program for keeping existing water works facilities in operation during construction so as to minimize interruption of service.

(b) Plans and specifications shall be prepared for every anticipated public water system project. The design utilized shall conform to the requirements of R309-500 through R309-550. Furthermore, the plans and specification shall be sufficiently detailed to assure that the project shall be properly constructed. Drawings shall be compatible with Division's document storage and microfilming practice. Drawings which are illegible or of unusual size shall not be accepted for review. Drawing size shall not exceed 30" x 42" nor be less than 8-1/2" x 11".

(c) The plans and specifications shall be stamped and signed by a licensed professional engineer in accordance with Section 58-22-602(2) of the Utah Code.

(d) Plans and specifications shall be reviewed for conformance with R309-500 through R309-550. No work shall commence on a public water system project until a plan approval has been issued by the Executive Secretary unless conditions outlined in R309-500-6(3) are met and waiving of plan submittal has been requested. If construction or the ordering of substantial equipment has not commenced within one year, a renewal of the Plan Approval shall be obtained prior to proceeding with construction.

(e) If, in the judgment of the Executive Secretary, alternate designs or specific solutions can protect the public health to the same or greater extent as achieved in R309-500 through R309-550, the Executive Secretary may grant an exception thereto (see the third paragraph of R309-500-4(1)).

(f) Novel equipment or treatment techniques may be developed which are not specifically addressed by these rules. These may be accepted by the Executive Secretary if it can be shown that:

(i) the technique will produce water meeting the requirements of R309-200 of these rules,

(ii) the Executive Secretary has determined that it will protect public health to the same extent provided by comparable treatment processes outlined in these rules, and

(iii) the Executive Secretary has determined the technique is as reliable as any comparable treatment process outlined is these rules.

(3) Waiving of Plan Submittal Requirement.

With identification of a professional engineer, as indicated

below, on a project notification form the plan submittal requirement may be waived for certain projects. In these instances, in lieu of plans and specifications, a "certification of rule conformance" shall be submitted along with the additional information required for an operating permit (see R309-500-9), signed by the professional engineer identified to Executive Secretary in (b) or, if the system has not employed, appointed, or designated such, the registered professional engineer who prepared the items in (a). Projects eligible for this waiving of plan submittal are:

(a) distribution system improvements which conform to a "master plan" previously reviewed and approved by the Executive Secretary and installed in accordance with the "system's standard drawings," also previously reviewed and approved by the Executive Secretary, or

(b) distribution system improvements consisting solely of pipelines and pipeline appurtenances (excluding pressure reducing valve stations and in-line booster pump stations);

(i) less than or equal to 4 inches in diameter in water systems (without fire hydrants) serving solely a residential population less than 3,300;

(ii) less than or equal to 8 inches in diameter in water systems (with fire hydrants) providing water for mixed use (commercial, industrial, agricultural and/or residential) to a population less than 3,300;

(iii) less than or equal to 12 inches in diameter in water systems(with fire hydrants) providing water for mixed use to a population between 3,300 and 50,000;

(iv) less than or equal to 16 inches in diameter in water systems (with fire hydrants) providing water for mixed use to a population greater than 50,000.

Additionally, the above systems shall employ, appoint or designate a registered professional engineer who is directly responsible for the entire public water system design and identify this individual to the Executive Secretary before being eligible for waiving of plan submittal requirements.

R309-500-7. Inspection During Construction.

Staff from the Division, or the appropriate local health department, after reasonable notice and presentation of credentials may make visits to the work site to assure compliance with these rules.

R309-500-8. Change Orders.

Any deviations from approved plans or specifications affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes, or the quality of water to be delivered, shall be reported to the Executive Secretary. If deemed appropriate, the Executive Secretary may require that revised plans and specifications be submitted for review. Revised plans or specifications shall be submitted to the Division in time to permit the review and approval of such plans or specifications before any construction work, which will be affected by such changes, is begun.

R309-500-9. Issuance of Operating Permit.

The Division shall be informed when a public drinking water project, or a well-defined phase thereof, is at or near completion. The new or modified facility shall not be used until an "Operating Permit" is issued, in writing, by the Executive Secretary. This permit shall not be issued until all of the following items are submitted and found to be acceptable for all projects with the exception of distribution lines (including in-line booster pump stations or pressure reducing stations), which may be placed into service prior to submittal of all items if the professional engineer responsible for the entire system, as identified to the Executive Secretary, has received items (1) and (4):

(1) a statement from a registered professional engineer that all conditions of Plan Approval were accomplished ("certification of rule conformance"),

(2) as-built "record" drawings; unless no changes are made from previously submitted and approved plans during construction,

(3) confirmation that a copy of the as-built "record" drawings has been received by the water system owner,

(4) evidence of proper flushing and disinfection in accordance with the appropriate ANSI/AWWA Standard,

(5) where appropriate, water quality data

(6) a statement from the Engineer indicating what changes to the project were necessary during construction, and certification that all of these changes were in conformance with these rules ("certification of rule conformance"),

(7) all other documentation which may have been required during the plan review process, and

(8) confirmation that the water system owner has been provided with an Operation and Maintenance manual for the new facility.

R309-500-10. Adequacy of Wastewater Disposal.

Plans and specifications for new water systems, or facilities required as a result of proposed subdivision additions to existing water systems, shall only be approved if the method(s) of wastewater disposal in the affected area have been approved, or been determined to be feasible, by the Utah Division of Water Quality or the appropriate local health agency.

R309-500-11. Financial Viability.

Owners of new or existing water systems are encouraged to develop realistic financial strategies for recouping the costs of constructing and operating their systems. Plans for water system facilities shall not be approved when it is obvious that public health will eventually be threatened because the anticipated usage of the system will not generate sufficient funds to insure proper operation and maintenance of the system (see also R309-352-5).

R309-500-12. Fee Schedule.

The Division may charge a fee for the review of plan and specifications. A fee schedule is available from the Division.

R309-500-13. Other Permits.

Local, county or other state permits may also be necessary before beginning construction of any drinking water project.

R309-500-14. Reference Documents.

All references made in R309-500 through R309-550 are available for inspection at the Division's office.

R309-500-15. Violations of These Rules.

Violations of rule contained in R309-500 through R309-550 are subject to the provisions of the Utah Safe Drinking Water Act (Title 19, Chapter 4 Section 109 of the Utah Code) and may be subject to fines and penalties.

KEY: drinking water, plan review, operation and maintenance requirements, permits
Date of Enactment or Last Substantive Amendment: August 15, 2001
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-505. Facility Design and Operation: Minimum Treatment Requirements.
R309-505-1. Purpose.

This rule specifies the type and degree of treatment which must be applied to the various types of water sources found in Utah. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water ~~which~~ consistently meeting applicable drinking water quality requirements and do not pose a threat to general public health.

R309-505-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63, Chapter 46a of the same, known as the Administrative Rulemaking Act.

R309-505-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-505-4. Pre-design Consultation.

The type and degree of treatment which shall be given a public drinking water source depends upon the nature of the source and the chemical and biological characteristics of the water it produces. Prior to the design of any water treatment facility, the Executive Secretary shall be consulted and concur that the contemplated treatment method is appropriate for the source being treated.

R309-505-5. Drinking Water Quality Standards.

Drinking water provided for human consumption by public drinking water systems must meet all water quality standards as specified in R309-200 [~~103~~]. Sources of water which do not meet applicable standards, or may not meet such standards due to the proximity of contamination sources, shall be appropriately treated as specified herein or physically disconnected from the drinking water system.

R309-505-6. Surface Water Sources.

(1) Determination of Surface Water Source.

A surface water source is any water source which rests or travels above ground for any period of time. Such sources include rivers, streams, creeks, lakes, reservoirs, ponds or impoundments.

(2) Treatment of a Surface Water Source.

(a) As a minimum, surface water sources shall be given complete treatment as specified in R309-525 or R309-530.

(b) All surface waters shall be treated to assure:

(i) at least 99.9 percent (3-log) removal and/or

inactivation of Giardia lamblia cysts between a point where the raw water is not subject to re-contamination by surface water runoff and a point downstream before or at the first customer;

(ii) at least 99.99 percent (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to re-contamination by surface water runoff and a point downstream before or at the first customer; and

(iii) removal of substances, as needed, to comply with the quality requirements of R309-200 [~~103~~].

(c) A public water system using a surface water source is considered to be in compliance with the requirements in subsection (b), above, if the treatment technique utilized produces water meeting the quality provisions of R309-200 [~~103~~], provided that all monitoring required by R309-215 [~~104~~] has been accomplished.

R309-505-7. Low Quality Ground Water Sources.

(1) Determination of a Low Quality Ground Water Source.

(a) A low quality ground water source is any well or spring which, as determined by the Executive Secretary, cannot reliably and consistently meet the drinking water quality standards described in R309-200 [~~103~~]. A water source shall be deemed to be a low quality ground water source if any of the following conditions exist:

(i) It is determined by the Executive Secretary that the source is Ground Water Under the Direct Influence of Surface Water.

(A) Classification of existing ground water sources, as to whether or not they are under direct influence of surface water, shall be made by the Executive Secretary.

(B) Frequent monitoring of turbidity, temperature, pH and conductivity of source water, in conjunction with similar monitoring of nearby surface waters may, if properly documented, provide sufficient evidence that the source is not influenced.

(C) Classification of existing sources shall be based upon evaluation of part or all of the following:

(I) Records review; including review of plans and specifications used for construction of collection facilities as submitted for review and approval prior to construction; review of as-built plans as submitted after construction, especially where springs are concerned; review of previous sanitary surveys; and review of any system bacteriological violations which may be linked directly to a source.

(II) Results of written survey form.

(III) On-site inspection by Division personnel.

(IV) Special tests such as Microscopic Particulate Analysis (MPA), dye tracer studies, or time of travel studies done in conjunction with the source protection program. Because of critical timing for tests such as the MPA, accelerated monitoring and reporting of water characteristics as mentioned in R309-505-7 (1)(a)(i)(B) above, may be required prior to MPA sampling.

(b) Testing for microbiological, chemical or radiologic contaminants determines that the drinking water quality requirements of R309-200 [~~103~~] cannot be reliably or consistently met.

(c) The location, design or construction of the well or spring makes it, in the judgement of the Executive Secretary, susceptible to natural or man-caused contamination.

(2) Treatment of a Low Quality Ground Water Source.

Low quality ground water sources shall be treated to assure that all chemical and biological contaminants are reduced to the levels which are reliably and consistently below MCL's prescribed in R309-200 [~~103~~]. If a source is determined to be ground water under the direct influence of surface water the following is required:

(a) Upon determination that a ground water source is under the direct influence of surface water, conventional surface water treatment, as specified in R309-525,or an approved equivalent, as specified in R309-530, shall be installed within 18 months or the source must be abandoned as a source of drinking water and physically disconnected from the drinking water system.

(b) Systems which must retain use of ground water sources classified as under direct influence of surface water shall start disinfection immediately on those sources and monitor in accordance with residual disinfectant monitoring under treatment plant monitoring and reporting found in R309-215 [~~104~~]- as well as maintain satisfactory "CT" values in accordance with R309-200-5(7) [~~103-2.7~~] during the 18 month interim period before conventional surface water treatment, or an approved equivalent, is installed. Chlorine, chlorine dioxide, chloramine, and ozone are considered capable of attaining required levels of disinfection.

(c) Once a ground water source is classified as under the influence of surface water, it must be considered to be a surface water source. Thus, all requirements in these rules which pertain to surface water sources also pertain to ground water under the direct influence of surface water.

R309-505-8. High Quality Ground Water Sources.

(1) Determination of a High Quality Ground Water Source.

A well or spring shall be deemed to be a high quality ground water source if the following conditions are met:

(a) The design and construction of the source are in conformance with these rules.

(b) Testing establishes that all applicable drinking water quality standards, as given in R309-200 [~~103~~], are met, and can be expected to be met in the future.

(c) The source is not susceptible to natural or man-caused contamination and, furthermore, adequate protection zones and management areas have been established in accordance with R309-600.

(2) Treatment of a High Quality Ground Water Source.

A high quality ground water source requires no treatment.

R309-505-9. Best Available Technologies (BATs).

EPA has identified Best Available Technologies (BATs) in national regulations regarding drinking water. BATs include Activated Alumina, Coagulation/Filtration, Direct Filtration, Diatomite Filtration, Electrodialysis Reversal, Corrosion Control, Granulated Activated Carbon, Ion Exchange, Lime Softening, Reverse

Osmosis, Polymer Addition and Packed Tower Aeration. Where a BAT is used to reduce the concentration of a contaminant:

(a) the requirements of R309-500 through R309-550 shall govern if the BAT is included in these rules.

(b) if the BAT is not included in R309-500 through R309-550, review of plans and specifications for a project will be governed by R309-530-9, New Treatment Processes or Equipment.

R309-505-10. Temporary Use of Bottled Water.

Initially the use of bottled water may be allowed on a temporary basis by the Executive Secretary. The continued use of bottled water shall be reviewed at least annually and only allowed after the Executive Secretary is satisfied that the PWS has made reasonable attempts since the last review to provide acceptable water on a more permanent basis [~~treatment on a more permanent nature~~] without success.

KEY: drinking water, surface water treatment, low quality ground water, high quality ground water
Date of Enactment or Last Substantive Amendment: September 13, 2005
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-510. Facility Design and Operation: Minimum Sizing Requirements.
R309-510-1. Purpose.

This rule specifies requirements for the sizing of public drinking water facilities such as sources (along with their associated treatment facilities), storage tanks, and pipelines. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-510-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-510-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-510-4. General.

This rule provides estimates of quantities and flow rates [~~estimations~~] which shall be used in the design of new systems, or if there is an absence of data collected by the public water system meeting the required confidence level for a reduction mentioned below, when evaluating water sources, storage facilities and pipelines. Within each of these three broad categories, the designer shall ascertain the contributions on demand from the indoor use of water, the outdoor use of water, and fire suppression activities (if required by local authorities). These components must be added together to determine the total demand on a given facility.

R309-510-5. Reduction of Requirements.

If acceptable data are presented, at or above the 90% confidence level, showing that the requirements made herein are excessive for a given project, the requirements may be appropriately reduced on a case by case basis by the Executive Secretary. In the case of Recreational Home Developments, in order to qualify for a quantity reduction, not only must the actual water consumption be less than quantities required by rule (with the confidence level indicated above) but enforceable policy restrictions must have been approved which prevent the use of such dwellings as a permanent domicile and these restrictions shall have been consistently enforced.

R309-510-6. Water Conservation.

This rule is based upon typical current water consumption

patterns in the State of Utah. They may be excessive in certain settings where legally enforceable water conservation measures exist. In these cases the requirements made in this section may be reduced on a case-by-case basis by the Executive Secretary.

R309-510-7. Source Sizing.

(1) Peak Day Demand and Average Yearly Demand.

Sources shall legally and physically meet water demands under two separate conditions. First, they shall meet the anticipated water demand on the day of highest water consumption. This is referred to as the peak day demand. Second, they shall also be able to provide one year's supply of water, the average yearly demand.

(2) Estimated Indoor Use.

In the absence of firm water use data, Tables 510-1 and 510-2 shall be used to estimate the peak day demand and average yearly demand for indoor water use.

TABLE 510-1
Source Demand for Indoor Use

Type of Connection	Peak Day Demand	Average Yearly Demand	
Year-round use			
Residential	800 gpd/conn	146,000 gal./conn	
ERC	800 gpd/ERC	146,000 gal./ERC	
Seasonal/Non-residential use			
Modern Recreation Camp	60 gpd/person		(see note 1)
Semi-Developed Camp			
a. with pit privies	5 gpd/person		(see note 1)
b. with flush toilets	20 gpd/person		(see note 1)
Hotel, Motel, and Resort	150 gpd/unit		(see note 1)
Labor Camp	50 gpd/person		(see note 1)
Recreational Vehicle Park	100 gpd/pad		(see note 1)
Roadway Rest Stop	7 gpd/vehicle		(see note 1)
Recreational Home Development	400 gpd/conn		(see note 1)

Note 1. Annual demand shall be based on the number of days the system will be open during the year times the peak day demand unless data acceptable to the Division, with a confidence level of 90% or greater showing a lesser annual consumption, can be presented.

TABLE 510-2
Source Demand for Individual Establishments[a]
(Indoor Use)

Type of Establishment	Peak Day Demand (gpd)
Airports	
a. per passenger	3
b. per employee	15
Boarding Houses	

a. for each resident boarder and employee	50
b. for each nonresident boarders	10
Bowling Alleys, per alley	
a. with snack bar	100
b. with no snack bar	85
Churches, per person	5
Country Clubs	
a. per resident member	100
b. per nonresident member present	25
c. per employee	15
Dentist's Office	
a. per chair	200
b. per staff member	35
Doctor's Office	
a. per patient	10
b. per staff member	35
Fairgrounds, per person	1
Fire Stations, per person	
a. with full-time employees and food prep.	70
b. with no full-time employees and no food prep.	5
Gyms	
a. per participant	25
b. per spectator	4
Hairdresser	
a. per chair	50
b. per operator	35
Hospitals, per bed space	250
Industrial Buildings, per 8 hour shift, per employee (exclusive of industrial waste)	
a. with showers	35
b. with no showers	15
Launderette, per washer	580
Movie Theaters	
a. auditorium, per seat	5
b. drive-in, per car space	10
Nursing Homes, per bed space	280
Office Buildings and Business Establishments, per shift, per employee (sanitary wastes only)	
a. with cafeteria	25
b. with no cafeteria	15
Picnic Parks, per person (toilet wastes only)	5
Restaurants	
a. ordinary restaurants (not 24 hour service)	35 per seat
b. 24 hour service	50 per seat
c. single service customer utensils only	2 per customer
d. or, per customer served (includes toilet and kitchen wastes)	10
Rooming House, per person	40
Schools, per person	
a. boarding	75
b. day, without cafeteria, gym or showers	15
c. day, with cafeteria, but no gym or showers	20
d. day, with cafeteria, gym and showers	25
Service Stations[(b)] ,per vehicle served	10

Skating Rink, Dance Halls, etc., per person	
a. no kitchen wastes	10
b. Additional for kitchen wastes	3
Ski Areas, per person (no kitchen wastes)	10
Stores	
a. per public toilet room	500
b. per employee	11
Swimming Pools and Bathhouses[(c)] ,per person	10
Taverns, Bars, Cocktail Lounges, per seat	20
Visitor Centers, per visitor	5

NOTES FOR TABLE 510-2:

1. Source capacity must at least equal the peak day demand of the system. Estimate this by assuming the facility is used to its maximum.

2. Generally, storage volume must at least equal one average day's demand.

3. Peak instantaneous demands may be estimated by fixture unit analysis as per Appendix E of the 200 International Plumbing Code.

(a) When more than one use will occur, the multiple use shall be considered in determining total demand. Small industrial plants maintaining a cafeteria and/or showers and club houses or motels maintaining swimming pools and/or laundries are typical examples of multiple uses. Uses other than those listed above shall be considered in relation to established demands from known or similar installations.

(b) or 250 gpd per pump,

(c) 20 x {Water Area (Ft^2) / 30} + Deck Area (Ft^2)

(3) Estimated Outdoor Use.

In the absence of firm water use data, Table 510-3 shall be used to estimate the peak day demand and average yearly demand for outdoor water use. The following procedure shall be used:

(a) Determine the location of the water system on the map entitled Irrigated Crop Consumptive Use Zones and Normal Annual Effective Precipitation, Utah as prepared by the Soil Conservation Service (available from the Division). Find the numbered zone, one through six, in which the water system is located (if located in an area described "non-arable" find nearest numbered zone).

(b) Determine the net number of acres which may be irrigated. This is generally done by starting with the gross acreage, then subtract out any area of roadway, driveway, sidewalk or patio pavements along with housing foundation footprints that can be reasonably expected for lots within a new subdivision or which is representative of existing lots. Before any other land area which may be considered "non-irrigated" (e.g. steep slopes, wooded areas, etc.) is subtracted from the gross area, the Division shall be consulted and agree that the land in question will not be irrigated.

(c) Refer to Table 510-3 to determine peak day demand and average yearly demand for outdoor use.

(d) The results of the indoor use and outdoor use tables shall be added together and source(s) shall be legally and

physically capable of meeting this combined demand.

TABLE 510-3
Source Demand for Irrigation
(Outdoor Use)

Map Zone	Peak Day Demand (gpm/irrigated acre)	Average Yearly Demand (AF/irrigated acre)
1	2.26	1.17
2	2.80	1.23
3	3.39	1.66
4	3.96	1.87
5	4.52	2.69
6	4.90	3.26

(4) Accounting for Variations in Source Yield.

The design engineer shall consider whether flow from the source(s) may vary. Where flow varies, as is the case for most springs, the minimum flowrate shall be used in determining the number of connections which may be supported by the source(s). Where historical records are sufficient, and where peak flows from the source(s) correspond with peak demand periods, the Executive Secretary may grant an exception to this requirement.

R309-510-8. Storage Sizing.

(1) General.

Each storage facility shall provide:

(a) equalization storage volume, to satisfy peak day demands for water for indoor use as well as outdoor use,

(b) fire suppression storage volume, if the water system is equipped with fire hydrants and intended to provide fire suppression [~~fighting~~] water, and

(c) emergency storage, if deemed appropriate by the water supplier or the Executive Secretary, to meet demands in the event of an unexpected emergency situation such as a line break or a treatment plant failures.

(2) Equalization Storage.

(a) All public drinking water systems shall be provided with equalization storage. The amount of equalization storage which must be provided varies with the nature of the water system, the extent of outdoor use and the location of the system.

(b) Required equalization storage for indoor use is provided in Table 510-4. Storage requirements for non-community systems [~~which are~~] not listed in this table shall be determined by calculating the average day demands from the information given in Table 510-2.

TABLE 510-4
Storage Volume for Indoor Use

Type	Volume Required (gallons)
Community Systems	
Residential;	

per single resident service connection	400
Non-Residentail;	
per Equivalent Residential Connection (ERC)	400
Non-Community Systems	
Modern Recreation Camp; per person	30
Semi-Developed Camp; per person	
a. with Pit Privies	2.5
b. with Flush Toilets	10
Hotel, Motel and Resort; per unit	75
Labor Camp; per unit	25
Recreational Vehicle Park; per pad	50
Roadway Rest Stop; per vehicle	3.5
Recreational Home Development; per connection	400

(c) Where the drinking water system provides water for outdoor use, such as the irrigation of lawns and gardens, the equalization storage volumes estimated in Table 510-5 shall be added to the indoor volumes estimated in Table 510-4. The procedure for determining the map zone and irrigated acreage for using Table 510-5 is outlined in Section R309-510-7(3).

TABLE 510-5
Storage Volume for Outdoor Use

Map Zone	Volume Required (gallons/irrigated acre)
1	1,782
2	1,873
3	2,528
4	2,848
5	4,081
6	4,964

(3) Fire Suppression Storage.

Fire suppression storage shall be required if the water system is intended to provide fire fighting water as evidenced by fire hydrants connected to the piping. The design engineer shall consult with the local fire suppression authority regarding needed fire flows in the area under consideration. This information shall be provided to the Division. Where no local fire suppression authority exists, needed fire suppression storage shall be assumed to be 120,000 gallons (1000 gpm for 2 hours).

(4) Emergency Storage.

Emergency storage shall be considered during the design process. The amount of emergency storage shall be based upon an assessment of risk and the desired degree of system dependability. The Executive Secretary may require emergency storage when it is warranted to protect public health and welfare.

R309-510-9. Distribution System Sizing.

(1) General Requirements.

The distribution system shall be designed to insure that minimum water pressures as required in R309-105-9 exist at all

points within the system. If the distribution system is equipped with fire hydrants, the Division will require a letter from the local fire authority stating the fire flow and duration required of the area to insure the system shall be designed to provide minimum pressures as required in R309-105-9 to exist at all points within the system when needed fire flows are imposed upon the peak day demand flows of the system.

(2) Indoor Use, Estimated Peak Instantaneous Demand.

(a) For community water systems and large non-community systems, the peak instantaneous demand for each pipeline shall be assumed for indoor use as:

$Q = 10.8 \times N^{0.64}$

where N equals the total number of ERC's, and Q equals the total flow (gpm) delivered to the total connections served by that pipeline.

For Recreational Vehicle Parks, the peak instantaneous flow for indoor use shall be based on the following:

TABLE 510-6

Peak Instantaneous Demand for Recreational Vehicle Parks

Number of Connections	Formula
0 to 59	$Q = 4N$
60 to 239	$Q = 80 + 20N^{0.5}$
240 or greater	$Q = 1.6N$

NOTES FOR TABLE 510-6:

Q is total peak instantaneous demand (gpm) and N is the maximum number of connections. However, if the only water use is via service buildings the peak instantaneous demand shall be calculated for the number of fixture units as presented in Appendix E of the 2000 International Plumbing Code.

(b) For small non-community water systems the peak instantaneous demand to be estimated for indoor use shall be calculated on a per-building basis for the number of fixture units as presented in Appendix E of the 2000 International Plumbing Code.

(3) Outdoor Use, Estimated Peak Instantaneous Demand.

Peak instantaneous demand to be estimated for outdoor use is given in Table 510-7. The procedure for determining the map zone and irrigated acreage for using Table 510-7 is outlined in Section R309-510-7(3).

TABLE 510-7

Peak Instantaneous Demand for Outdoor Use

Map Zone	Peak Instantaneous Demand (gpm/irrigated acre)
1	4.52
2	5.60
3	6.78

4	7.92
5	9.04
6	9.80

(4) Fire Flows.

(a) Distribution systems shall be designed to deliver needed fire flows if fire hydrants are provided. The design engineer shall consult with the local fire suppression authority regarding needed fire flows in the area under consideration. This information shall be provided to the Division. Where no local fire suppression authority exists, needed fire flows shall be assumed to be 1000 gpm unless the local planning commission provides a letter indicating that the system will not be required to provide any fire flows, in which case fire hydrants will not be allowed to be installed on any mains.

(b) If a distribution system is equipped with fire hydrants, the system shall be designed to insure that minimum pressures required by R309-105-9 exist at all points within the system when fire flows are added to the peak day demand of the system. Refer to Section R309-510-7 for information on determining the peak day demand of the system.

KEY: drinking water, minimum sizing, water conservation
Date of Enactment or Last Substantive Amendment: March 8, 2006
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-515. Facility Design and Operation: Source Development.
R309-515-1. Purpose.

This rule specifies requirements for public drinking water sources. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water that consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-515-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code Annotated and in accordance with Title 63, Chapter 46a of the same, known as the Administrative Rulemaking Act.

R309-515-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-515-4. General.

(1) Issues to be Considered.

The selection, development and operation of a public drinking water source must be done in a manner which will protect public health and assure that all required water quality standards, as described in R309-200, are met.

(2) Communication with the Division.

Because of the issues described above in (1), engineers are advised to work closely with the Division to help assure that sources are properly sited, developed and operated.

(3) Number of Sources and Quantity Requirements.

Community water systems established after January 1, 1998 serving more than 100 connections shall have a minimum of two sources, except where served by a water treatment plant. Community Water Systems established prior to that date, currently serving more than 100 connections, shall obtain a separate source no later than January 1, 2000. For all systems, the total developed source capacity(ies) shall equal or exceed the peak day demand of the system. Refer to R309-510-7 of these rules for procedure to estimate the peak day demand.

(4) Quality Requirements.

In selecting a source of water for development, the designing engineer shall demonstrate to the satisfaction of the Executive Secretary that the source(s) selected for use in public water systems are of satisfactory quality, or can be treated in a manner so that the quality requirements of R309-200 can be met.

(5) Initial Analyses.

All new drinking water sources, unless otherwise noted below, shall be analyzed for the following:

(a) All the primary and secondary inorganic contaminants

listed in R309-200, Table 200-1 and Table 200-5 (excluding Asbestos unless it would be required by R309-205-5(2)),

(b) Ammonia as N; Boron; Calcium; Chromium, Hex as Cr; Copper; Lead; Magnesium; Potassium; Turbidity, as NTU; Specific Conductivity at 25 degrees Celsius, u mhos/cm; Bicarbonate; Carbon Dioxide; Carbonate; Hydroxide; Phosphorous, Ortho as P; Silica, dissolved as SiO_2; Surfactant as MBAS; Total Hardness as $CaCO_3$; and Alkalinity as $CaCO_3$,

(c) Pesticides, PCB's and SOC's as listed in R309-200-5(3)(a), Table 200-2 unless the system is a transient non-community pws or, if a community pws or non-transient non-community pws, they have received waivers in accordance with R309-205-6(1)(f). The following six constituents have been excused from monitoring in the State by the EPA, dibromochloropropane, ethylene dibromide, Diquat, Endothall, glyphosate and Dioxin,

(d) VOC's as listed in R309-200-5(3)(b), Table 200-3 unless the system is a transient non-community pws, and

(e) Radiologic chemicals as listed in R309-200-5(4) unless the system is a non-transient non-community pws or a transient non-community pws.

All analyses shall be performed by a certified laboratory as required by R309-205-4 (Specially prepared sample bottles are required),

(6) Source Classification.

Subsection R309-505-7(1)(a)(i) provides information on the classification of water sources. The Executive Secretary shall classify all existing or new sources as either:

(a) Surface water or ground water under direct influence of surface water which will require conventional surface water treatment or an approved equivalent, or as

(b) Ground water not under the direct influence of surface water.

(7) Latitude and Longitude.

The latitude and longitude, to at least the nearest second, or the location by section, township, range, and course and distance from an established outside section corner or quarter corner of each point of diversion shall be submitted to the Executive Secretary prior to source approval.

R309-515-5. Surface Water Sources.

(1) Definition.

A surface water source, as is defined in R309-110, shall include, but not be limited to tributary systems, drainage basins, natural lakes, artificial reservoirs, impoundments and springs or wells which have been classified as being directly influenced by surface water. Surface water sources will not be considered for culinary use unless they can be rendered acceptable by conventional surface water treatment or other equivalent treatment techniques acceptable to the Executive Secretary.

(2) Pre-design Submittal.

The following information must be submitted to the Executive Secretary and approved in writing before commencement of design of diversion structures and/or water treatment facilities:

(a) A copy of the chemical analyses required by R309-200 and

described in R309-515-4(5) above, and

(b) A survey of the watershed tributary to the watercourse along which diversion structures are proposed. The survey shall include, but not be limited to:

(i) determining possible future uses of impoundments or reservoirs,

(ii) the present stream classification by the Division of Water Quality, any obstacles to having stream(s) reclassified 1C, and determining degree of watershed control by owner or other agencies,

(iii) assessing degree of hazard to the supply by accidental spillage of materials that may be toxic, harmful or detrimental to treatment processes,

(iv) obtaining samples over a sufficient period of time to assess the microbiological, physical, chemical and radiological characteristics and variations of the water,

(v) assessing the capability of the proposed treatment process to reduce contaminants to applicable standards, and

(vi) consideration of currents, wind and ice conditions, and the effect of tributary streams at their confluence.

(3) Pre-construction Submittal.

Following approval of a surface water source, the following additional information must be submitted for review and approval prior to commencement of construction:

(a) Evidence that the water system owner has a legal right to divert water from the proposed source for domestic or municipal purposes;

(b) Documentation regarding the minimum firm yield which the watercourse is capable of producing (see R309-515-5(4)(a) below; and

(c) Complete plans and specifications and supporting documentation for the proposed treatment facilities so as to ascertain compliance with R309-525 or R309-530.

(4) Quantity.

The quantity of water from surface sources shall:

(a) Be assumed to be no greater than the low flow of a 25 year recurrence interval or the low flow of record for these sources when 25 years of records are not available;

(b) Meet or exceed the anticipated peak day demand for water as estimated in R309-510-7 and provide a reasonable surplus for anticipated growth; and

(c) Be adequate to compensate for all losses such as silting, evaporation, seepage, and sludge disposal which would be anticipated in the normal operation of the treatment facility.

(5) Diversion Structures.

Design of intake structures shall provide for:

(a) Withdrawal of water from more than one level if quality varies with depth;

(b) Intake of lowest withdrawal elevation located at sufficient depth to be kept submerged at the low water elevation of the reservoir;

(c) Separate facilities for release of less desirable water held in storage;

(d) Occasional cleaning of the inlet line;

(e) A diversion device capable of keeping large quantities of fish or debris from entering an intake structure; and

(f) Suitable protection of pumps where used to transfer diverted water (refer to R309-540-5).

(6) Impoundments.

The design of an impoundment reservoir shall provide for, where applicable:

(a) Removal of brush and trees to the high water level;

(b) Protection from floods during construction;

(c) Abandonment of all wells which may be inundated (refer to applicable requirements of the Division of Water Rights); and

(d) Adequate precautions to limit nutrient loads.

R309-515-6. Ground Water - Wells.

(1) Required Treatment.

If properly developed, water from wells may be suitable for culinary use without treatment. A determination as to whether treatment may be required can only be made after the source has been developed and evaluated.

(2) Standby Power.

Water suppliers, particularly community water suppliers, should assess the capability of their system in the event of a power outage. If gravity fed spring sources are not available, one or more of the system's well sources should be equipped for operation during power outages. In this event:

(a) To ensure continuous service when the primary power has been interrupted, a power supply should be provided through connection to at least two independent public power sources, or portable or in-place auxiliary power available as an alternative; and

(b) When automatic pre-lubrication of pump bearings is necessary, and an auxiliary power supply is provided, the pre-lubrication line should be provided with a valved by-pass around the automatic control, or the automatic control shall be wired to the emergency power source.

(3) The Utah Division of Water Rights.

The Utah Division of Water Rights (State Engineer's Office) regulates the drilling of water wells. Before the drilling of a well commences, the well driller must receive a start card from the State Engineer's Office.

(4) Source Protection.

Public drinking water systems are responsible for protecting their sources from contamination. The selection of a well location shall only be made after consideration of the requirements of R309-600. Sources shall be located in an area which will minimize threats from existing or potential sources of pollution.

If certain precautions are taken, sewer lines may be permitted within a public drinking water system's source protection zones at the discretion of the Executive Secretary. When sewer lines are permitted in protection zones both sewer lines and manholes shall be specially constructed as follows:

(a) sewer lines shall be ductile iron pipe with mechanical joints or fusion welded high density polyethylene plastic pipe

(solvent welded joints shall not be accepted);

(b) lateral to main connection shall be shop fabricated or saddled with a mechanical clamping watertight device designed for the specific pipe;

(c) the sewer pipe to manhole connections shall made using a shop fabricated sewer pipe seal ring cast into the manhole base (a mechanical joint shall be installed within 12 inches of the manhole base on each line entering the manhole, regardless of the pipe material);

(d) the sewer pipe shall be laid with no greater than 2 percent deflection at any joint;

(e) backfill shall be compacted to not less than 95 percent of maximum laboratory density as determined in accordance with ASTM Standard D-690;

(f) sewer manholes shall meet the following requirements:

(i) the manhole base and walls, up to a point at least 12 inches above the top of the upper most sewer pipe entering the manhole, shall be shop fabricated in a single concrete pour.

(ii) the manholes shall be constructed of reinforced concrete.

(iii) all sewer lines and manholes shall be air pressure tested after installation.

(5) Outline of Well Approval Process.

(a) Well drilling shall not commence until both of the following items are submitted and receive a favorable review:

(i) a Preliminary Evaluation Report on source protection issues as required by R309-600-13, and

(ii) engineering plans and specifications governing the well drilling, prepared by a licensed well driller holding a current Utah Well Drillers Permit if previously authorized by the Executive Secretary or prepared, signed and stamped by a licensed professional engineer or professional geologist licensed to practice in Utah.

(b) Grouting Inspection During Well Construction.

An engineer from the Division, or the appropriate district engineer of the Department of Environmental Quality, an authorized representative of the State Engineer's Office, or an individual authorized by the Executive Secretary shall be contacted at least three days before the anticipated beginning of the well grouting procedure (see R309-515-6(6)(i)). The well grouting procedure shall be witnessed by one of these individuals or their designee.

(c) After completion of the well drilling the following information shall be submitted and receive a favorable review before water from the well can be introduced into a public water system:

(i) a copy of the "Report of Well Driller" as required by the State Engineer's Office which is complete in all aspects and has been stamped as received by the same;

(ii) a copy of the letter from the authorized individual described in R309-515-6(5)(b) above, indicating inspection and confirmation that the well was grouted in accordance with the well drilling specifications and the requirements of this rule;

(iii) a copy of the pump test including the yield vs. drawdown test as described in R309-515-6(10)(b) along with

comments / interpretation by a licensed professional engineer or licensed professional geologist of the graphic drawdown information required by R309-515-6(b)(vi)(E);

(iv) a copy of the chemical analyses required by R309-515-4(5);

(v) documentation indicating that the water system owner has a right to divert water for domestic or municipal purposes from the well source;

(vi) a copy of complete plans and specifications prepared, signed and stamped by a licensed professional engineer covering the well housing, equipment and diversion piping necessary to introduce water from the well into the distribution system; and

(vii) a bacteriological analysis of water obtained from the well after installation of permanent equipment, disinfection and flushing.

(d) An Operation Permit shall be obtained in accordance with R309-500-9 before any water from the well is introduced into a public water system.

(6) Well Materials, Design and Construction.

(a) ANSI/NSF Standards 60 and 61 Certification.

All interior surfaces must consist of products complying with ANSI/NSF Standard 61. This requirement applies to drop pipes, well screens, coatings, adhesives, solders, fluxes, pumps, switches, electrical wire, sensors, and all other equipment or surfaces which may contact the drinking water.

All substances introduced into the well during construction or development shall be certified to comply with ANSI/NSF Standard 60. This requirement applies to drilling fluids (biocides, clay thinners, defoamers, foamers, loss circulation materials, lubricants, oxygen scavengers, viscosifiers, weighting agents) and regenerants. This requirement also applies to well grouting and sealing materials which may come in direct contact with the drinking water.

(b) Permanent Steel Casing Pipe shall:

(i) be new single steel casing pipe meeting AWWA Standard A-100, ASTM or API specifications and having a minimum weight and thickness as given in Table 1 found in R655-4-9.4 of the Utah Administrative Code (Administrative Rules for Water Well Drillers, adopted January 14, 2005 [~~January 1, 2001~~], Division of Water Rights);

(ii) have additional thickness and weight if minimum thickness is not considered sufficient to assure reasonable life expectancy of the well;

(iii) be capable of withstanding forces to which it is subjected;

(iv) be equipped with a drive shoe when driven;

(v) have full circumferential welds or threaded coupling joints; and

(vi) project at least 18 inches above the anticipated final ground surface and at least 12 inches above the anticipated pump house floor level. At sites subject to flooding the top of the well casing shall terminate at least three feet above the 100 year flood level or the highest known flood elevation, whichever is higher.

(c) Non-Ferrous Casing Material.

The use of any non-ferrous material for a well casing shall receive prior approval of the Executive Secretary based on the ability of the material to perform its desired function. Thermoplastic water well casing pipe shall meet ANSI/ASTM Standard F480-76 and shall bear the logo NSF-wc indicating compliance with NSF Standard 14 for use as well casing.

(d) Disposal of Cuttings.

Cuttings and waste from well drilling operations shall not be discharged into a waterway, lake or reservoir. The rules of the Utah Division of Water Quality must be observed with respect to these discharges.

(e) Packers.

Packers, if used, shall be of material that will not impart taste, odor, toxic substances or bacterial contamination to the well water. Lead, or partial lead packers are specifically prohibited.

(f) Screens.

The use of well screens is recommended where appropriate and, if used, they shall:

(i) be constructed of material resistant to damage by chemical action of groundwater or cleaning operations;

(ii) have size of openings based on sieve analysis of formations or gravel pack materials;

(iii) have sufficient diameter to provide adequate specific capacity and low aperture entrance velocities;

(iv) be installed so that the operating water level remains above the screen under all pumping conditions; and

(v) be provided with a bottom plate or washdown bottom fitting of the same material as the screen.

(g) Plumbness and Alignment Requirements.

Every well shall be tested for plumbness and vertical alignment in accordance with AWWA Standard A100. Plans and specifications submitted for review shall:

(i) have the test method and allowable tolerances clearly stated in the specifications. and

(ii) clearly indicate any options the design engineer may have if the well fails to meet the requirements. Generally wells may be accepted if the misalignment does not interfere with the installation or operation of the pump or uniform placement of grout.

(h) Casing Perforations.

The placement of perforations in the well casing shall:

(i) be so located to permit as far as practical the uniform collection of water around the circumference of the well casing, and

(ii) be of dimensions and size to restrain the water bearing soils from entrance into the well.

(i) Grouting Techniques and Requirements.

All permanent well casing for public drinking water wells shall be grouted to a depth of at least 100 feet below the ground surface unless an "exception" is issued by the Executive Secretary (see R309-500-4(1)).

If a well is to be considered in a protected aquifer the

grout seal shall extend from the ground surface down to at least 100 feet below the surface, and through the protective layer, as described in R309-600-6(1)(v) (see also R309-515 [~~151~~]-6(6)(i)(iii)(D) below).

The following applies to all drinking water wells:

(i) Consideration During Well Construction.

(A) Sufficient annular opening shall be provided to permit a minimum of two inches of grout between the permanent casing and the drilled hole, taking into consideration any joint couplings. If a carrier casing is left in place, the minimum clearances above shall pertain to both annular openings (between casings and between carrier casing and the drilled hole), the carrier casing shall be adequately perforated so as to ensure grout contact with the native formations, and the carrier casing shall be withdrawn at least five feet during grouting operations.

(B) Additional information is available from the Division for recommended construction methods for grout placement.

(C) The casing(s) must be provided with sufficient guides welded to the casing to permit unobstructed flow and uniform thickness of grout.

(ii) Grouting Materials.

(A) Neat Cement Grout.

Cement, conforming to ASTM Standard C150, and water, with no more than six gallons of water per sack of cement, shall be used for two inch openings. Additives may be used to increase fluidity subject to approval by the Executive Secretary.

(B) Concrete Grout.

Equal parts of cement conforming to ASTM Standard C150, and sand, with not more than six gallons of water per sack of cement may be used for openings larger than two inches.

(C) Clay Seal.

Where an annular opening greater than six inches is available a clay seal of clean local clay mixed with at least ten percent swelling bentonite may be used when approved by the Executive Secretary.

(iii) Application.

(A) When the annular opening is less than four inches, grout shall be installed under pressure, by means of a positive displacement grout pump, from the bottom of the annular opening to be filled.

(B) When the annular opening is four or more inches and 100 feet or less in depth, and concrete grout is used, it may be placed by gravity through a grout pipe installed to the bottom of the annular opening in one continuous operation until the annular opening is filled.

(C) All temporary construction casings should be removed but shall be withdrawn at least five feet during the grouting operation to ensure grout contact with the native formations.

(D) When a "well in a protected aquifer" classification is desired, the grout seal shall extend from the ground surface down to at least 100 feet below the surface, and through the protective clay layer (see R309-600-6(1)(v)). If the clay layer starts below 100 feet, grout shall extend from the ground surface to a depth of at least 100 feet, grout or native fill may be utilized from there

to the top of the clay layer, and then grout placed completely through the protective clay layer. If the clay layer starts and ends above 100 feet, grout shall extend from the ground surface down to and completely through the protective clay layer.

(E) After cement grouting is applied, work on the well shall be discontinued until the cement or concrete grout has properly set; usually a period of 72 hours.

(j) Water Entered Into Well During Construction.

Any water entering a well during construction shall not be contaminated and should be obtained from a chlorinated municipal system. Where this is not possible the water must be dosed to give a 100 mg/l free chlorine residual. Refer also to the administrative rules of the Division of Water Rights in this regard.

(k) Gravel Pack Wells.

The following shall apply to gravel packed wells:

(i) the gravel pack material is to be of well rounded particles, 95 percent siliceous material, that are smooth and uniform, free of foreign material, properly sized, washed and then disinfected immediately prior to or during placement,

(ii) the gravel pack is placed in one uniform continuous operation,

(iii) refill pipes, when used, are Schedule 40 steel pipe incorporated within the pump foundation and terminated with screwed or welded caps at least 12 inches above the pump house floor or concrete apron,

(iv) refill pipes located in the grouted annular opening be surrounded by a minimum of 1.5 inches of grout,

(v) protection provided to prevent leakage of grout into the gravel pack or screen, and

(vi) any casings not withdrawn entirely meet requirements of R309-515-6(6)(b) or R309-515-6(6)(c).

(7) Well Development.

(a) Every well shall be developed to remove the native silts and clays, drilling mud or finer fraction of the gravel pack.

(b) Development should continue until the maximum specific capacity is obtained from the completed well.

(c) Where chemical conditioning is required, the specifications shall include provisions for the method, equipment, chemicals, testing for residual chemicals, and disposal of waste and inhibitors.

(d) Where blasting procedures may be used the specifications shall include the provisions for blasting and cleaning. Special attention shall be given to assure that the grouting and casing are not damaged by the blasting.

(8) Capping Requirements.

(a) A welded metal plate or a threaded cap is the preferred method for capping a completed well until permanent equipment is installed.

(b) At all times during the progress of work the contractor shall provide protection to prevent tampering with the well or entrance of foreign materials.

(9) Well Abandonment.

(a) Test wells and groundwater sources which are to be

permanently abandoned shall be sealed by such methods as necessary to restore the controlling geological conditions which existed prior to construction or as directed by the Utah Division of Water Rights.

(b) Wells to be abandoned shall be sealed to prevent undesirable exchange of water from one aquifer to another. Preference [~~Prefernce~~] shall be given to using a neat cement grout. Where fill materials are used, which are other than cement grout or concrete, they shall be disinfected and free of foreign materials. When an abandoned well [~~will~~] is filled with cement-grout or concrete, these materials shall be applied to the well-hole through a pipe, tremie, or bailer.

(10) Well Assessment.

(a) Step Drawdown Test.

Preliminary to the constant-rate test required below, it is recommended that a step-drawdown test (uniform increases in pumping rates over uniform time intervals with single drawdown measurements taken at the end of the intervals) be conducted to determine the maximum pumping rate for the desired intake setting.

(b) Constant-Rate Test.

A "constant-rate" yield and drawdown test shall:

(i) be performed on every production well after construction or subsequent treatment and prior to placement of the permanent pump,

(ii) have the test methods clearly indicated in the specifications,

(iii) have a test pump with sufficient capacity that when pumped against the maximum anticipated drawdown, it will be capable of pumping in excess of the desired design discharge rate,

(iv) provide for continuous pumping for at least 24 hours or until stabilized drawdown has continued for at least six hours when test pumped at a "constant-rate" equal to the desired design discharge rate,

(v) provide the following data:

(A) capacity vs. head characteristics for the test pump (manufacturer's pump curve),

(B) static water level (in feet to the nearest tenth, as measured from an identified datum; usually the top of casing),

(C) depth of test pump intake,

(D) time and date of starting and ending test(s),

(vi) For the "constant-rate" test provide the following at time intervals sufficient for at least ten essentially uniform intervals for each log cycle of the graphic evaluation required below:

(A) record the time since starting test (in minutes),

(B) record the actual pumping rate,

(C) record the pumping water level (in feet to the nearest tenth, as measured from the same datum used for the static water level),

(D) record the drawdown (pumping water level minus static water level in feet to the nearest tenth),

(E) provide graphic evaluation on semi-logarithmic graph paper by plotting the drawdown measurements on the arithmetic scale at locations corresponding to time since starting test on

the logarithmic scale, and

(vii) Immediately after termination of the constant-rate test, and for a period of time until there are no changes in depth to water level measurements for at least six hours, record the following at time intervals similar to those used during the constant-rate pump test:

(A) time since stopping pump test (in minutes),

(B) depth to water level (in feet to the nearest tenth, as measured from the same datum used for the pumping water level).

(11) Well Disinfection.

Every new, modified, or reconditioned well including pumping equipment shall be disinfected before being placed into service for drinking water use. These shall be disinfected according to AWWA Standard C654-03 published by the American Water Works Association as modified to incorporate the following as a minimum standard:

(i) the well shall be disinfected with a chlorine solution of sufficient volume and strength and so applied that a concentration of at least 50 parts per million is obtained in all parts of the well and comes in contact with equipment installed in the well. This solution shall remain in the well for a period of at least eight hours, and

(ii) a satisfactory bacteriologic water sample analysis shall be obtained prior to the use of water from the well in a public water system.

(12) Well Equipping.

(a) Naturally Flowing Wells.

Naturally flowing wells shall:

(i) have the discharge controlled by valves,

(ii) be provided with permanent casing and sealed by grout,

(iii) if erosion of the confining bed adjacent to the well appears likely, special protective construction may be required by the Division.

(b) Line Shaft Pumps.

Wells equipped with line shaft pumps shall:

(i) have the casing firmly connected to the pump structure or have the casing inserted into the recess extending at least 0.5 inches into the pump base,

(ii) have the pump foundation and base designed to prevent fluids from coming into contact with joints between the pump base and the casing,

(iii) be designed such that the intake of the well pump is at least ten feet below the maximum anticipated drawdown elevation,

(iv) avoid the use of oil lubrication for pumps with intake screens set at depths less than 400 feet (see R309-105-10(7) and/or R309-515-8(2)for additional requirements of lubricants).

(c) Submersible Pumps.

Where a submersible pump is used:

(i) The top of the casing shall be effectively sealed against the entrance of water under all conditions of vibration or movement of conductors or cables.

(ii) The electrical cable shall be firmly attached to the riser pipe at 20 foot intervals or less.

(iv) The intake of the well pump must be at least ten feet below the maximum anticipated drawdown elevation.

(d) Pitless Well Units and Adapters.

Pitless well units and adapters shall:

(i) not be used unless the specific application has been approved by the Executive Secretary,

(ii) terminate at least 18 inches above final ground elevation or three feet above the highest known flood elevation whichever is greater,

(iii) be approved by NSF International or the Pitless Adapter Association or other appropriate Review Authority,

(iv) have suitable access to the interior of the casing in order to disinfect the well,

(v) have a suitable sanitary seal or cover at the upper terminal of the casing that will prevent the entrance of any fluids or contamination, especially at the connection point of the electrical cables,

(vi) have suitable access so that measurements of static and pumped water levels in the well can be obtained,

(vii) allow at least one check valve within the well casing,

(viii) be furnished with a cover that is lockable or otherwise protected against vandalism or sabotage,

(ix) be shop-fabricated from the point of connection with the well casing to the unit cap or cover,

(x) be of watertight construction throughout,

(xi) be constructed of materials at least equivalent to and having wall thickness compatible to the casing,

(xii) have field connection to the lateral discharge from the pitless unit of threaded, flanged or mechanical joint connection,

(xiii) be threaded or welded to the well casing. If the connection to the casing is by field weld, the shop assembled unit must be designed specifically for field welding to the casing. The only field welding permitted on the pitless unit will be that needed to connect a pitless unit to the casing, and

(xiv) have an inside diameter as great as that of the well casing, up to and including casing diameters of 12 inches, to facilitate work and repair on the well, pump, or well screen.

(e) Well Discharge Piping.

The discharge piping shall:

(i) be designed so that the friction loss will be low,

(ii) have control valves and appurtenances located above the pump house floor when an above-ground discharge is provided,

(iii) be protected against the entrance of contamination,

(iv) be equipped with (in order of placement from the well head) a smooth nosed sampling tap, a check valve, a pressure gauge, a means of measuring flow and a shutoff valve,

(v) where a well pumps directly into a distribution system, be equipped with an air release vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a down-turned position at least six inches above the floor and covered with a No. 14 mesh corrosion resistant screen. An exception to this requirement will be allowed provided specific proposed well head valve and piping design includes

provisions for pumping to waste all trapped air before water is introduced into the distribution system,

(vi) have all exposed piping valves and appurtenances protected against physical damage and freezing,

(vii) be properly anchored to prevent movement, and

(f) Water Level Measurement.

(i) Provisions shall be made to permit periodic measurement of water levels in the completed well.

(ii) Where permanent water level measuring equipment is installed it shall be made using corrosion resistant materials attached firmly to the drop pipe or pump column and installed in such a manner as to prevent entrance of foreign materials.

(g) Observation Wells.

Observation wells shall be:

(i) constructed in accordance with the requirements for permanent wells if they are to remain in service after completion of a water supply well, and

(ii) protected at the upper terminal to preclude entrance of foreign materials.

(h) Electrical Protection.

Sufficient electrical controls shall be placed on all pump motors to eliminate electrical problems due to phase shifts, surges, lightning, etc.

(13) Well House Construction.

The use of a well house is strongly recommended, particularly in installations utilizing above ground motors.

In addition to applicable provisions of R309-540, well pump houses shall conform to the following:

(a) Casing Projection Above Floor.

The permanent casing for all ground water wells shall project at least 12 inches above the pump house floor or concrete apron surface and at least 18 inches above the final ground surface. However, casings terminated in underground vaults may be permitted if the vault is provided with a drain to daylight sized to handle in excess of the well flow and surface runoff is directed away from the vault access.

(b) Floor Drain.

Where a well house is constructed the floor surface shall be at least six inches above the final ground elevation and shall be sloped to provide drainage. A "drain-to-daylight" shall be provided unless highly impractical.

(c) Earth Berm.

Sites subject to flooding shall be provided with an earth berm terminating at an elevation at least two feet above the highest known flood elevation or other suitable protection as determined by the Executive Secretary.

(d) Well Casing Termination at Flood Sites.

The top of the well casing at sites subject to flooding shall terminate at least 3 feet above the 100 year flood level or the highest known flood elevation, whichever is higher (refer to R309-515-6(6)(b)(vi)).

(e) Miscellaneous.

The well house shall be ventilated, heated and lighted in such a manner as to assure adequate protection of the equipment

(refer to R309-540-5(2) (a) through (h)

(f) Fencing.

Where necessary to protect the quality of the well water the Executive Secretary may require that certain wells be fenced in a manner similar to fencing required around spring areas.

(g) Access.

An access shall be provided either through the well house roof or sidewalls in the event the pump must be pulled for replacement or servicing the well.

R309-515-7. Ground Water - Springs.

(1) General.

Springs vary greatly in their characteristics and they should be observed for some time prior to development to determine any flow and quality variations. Springs determined to be "under the direct influence of surface water" will have to be given "surface water treatment".

(2) Source Protection.

Public drinking water systems are responsible for protecting their spring sources from contamination. The selection of a spring should only be made after consideration of the requirements of R309-515-4. Springs must be located in an area which shall minimize threats from existing or potential sources of pollution. A Preliminary Evaluation Report on source protection issues is required by R309-600-13(2). If certain precautions are taken, sewer lines may be permitted within a public drinking water system's source protection zones at the discretion of the Executive Secretary. When sewer lines are permitted in protection zones both sewer lines and manholes shall be specially constructed as described in R309-515-6(4).

(3) Surface Water Influence.

Some springs yield water which has been filtered underground for years, other springs yield water which has been filtered underground only a matter of hours. Even with proper development, the untreated water from certain springs may exhibit turbidity and high coliform counts. This indicates that the spring water is not being sufficiently filtered in underground travel. If a spring is determined to be "under the direct influence of surface water", it shall be given "conventional surface water treatment" (refer to R309-505-6).

(4) Pre-construction Submittal

Before commencement of construction of spring development improvements the following information must be submitted to the Executive Secretary and approved in writing.

(a) Detailed plans and specifications covering the development work.

(b) A copy of an engineer's or geologist's statement indicating:

(i) the historical record (if available) of spring flow variation,

(ii) expected minimum flow and the time of year it will occur,

(iii) expected maximum flow and the time of year it will occur,

(iv) expected average flow,

(v) the behavior of the spring during drought conditions.

After evaluating this information, the Division will assign a "firm yield" for the spring which will be used in assessing the number of and type of connections which can be served by the spring (see "desired design discharge rate" in R309-110).

(c) A copy of documentation indicating the water system owner has a right to divert water for domestic or municipal purposes from the spring source.

(d) A Preliminary Evaluation Report on source protection issues as required by R309-600-13.

(e) A copy of the chemical analyses required by R309-515-4(5).

(f) An assessment of whether the spring is "under the direct influence of surface water" (refer to R309-505-7(1)(a).

(5) Information Required after Spring Development.

After development of a culinary spring, the following information shall be submitted:

(a) Proof of satisfactory bacteriologic quality.

(b) Information on the rate of flow developed from the spring.

(c) As-built plans of spring development.

(6) Operation Permit Required.

Water from the spring can be introduced into a public water system only after it has been approved for use, in writing, by the Executive Secretary (see R309-500-9).

(7) Spring Development.

The development of springs for drinking water purposes shall comply with the following requirements:

(a) The spring collection device, whether it be collection tile, perforated pipe, imported gravel, infiltration boxes or tunnels must be covered with a minimum of ten feet of relatively impervious soil cover. Such cover must extend a minimum of 15 feet in all horizontal directions from the spring collection device. Clean, inert, non-organic material shall be placed in the vicinity of the collection device(s).

(b) Where it is impossible to achieve the ten feet of relatively impervious soil cover, an acceptable alternate will be the use of an impermeable liner provided that:

(i) the liner has a minimum thickness of at least 10 mils,

(ii) all seams in the liner are folded or welded to prevent leakage,

(iii) the liner is certified as complying with ANSI/NSF Standard 61. This requirement is waived if certain that the drinking water will not contact the liner,

(iv) the liner is installed in such a manner as to assure its integrity. No stones, two inch or larger or sharp edged, shall be located within two inches of the liner,

(v) a minimum of two feet of relatively impervious soil cover is placed over the impermeable liner,

(vi) the soil and liner cover are extended a minimum of 15 feet in all horizontal directions from the collection devices.

(c) Each spring collection area shall be provided with at least one collection box to permit spring inspection and testing.

(d) All junction boxes and collection boxes, must comply with R309-545 with respect to access openings, venting, and tank overflow. Lids for these spring boxes shall be gasketed and the box adequately vented.

(e) The spring collection area shall be surrounded by a fence located a distance of 50 feet (preferably 100 feet if conditions allow) from all collection devices on land at an elevation equal to or higher than the collection device, and a distance of 15 feet from all collection devices on land at an elevation lower than the collection device. The elevation datum to be used is the surface elevation at the point of collection. The fence shall be at least "stock tight" (see R309-110). In remote areas where no grazing or public access is possible, the fencing requirement may be waived by the Executive Secretary. In populated areas a six foot high chain link fence with three strands of barbed wire may be required.

(f) Within the fenced area all vegetation which has a deep root system shall be removed.

(g) A diversion channel, or berm, capable of diverting all anticipated surface water runoff away from the spring collection area shall be constructed immediately inside the fenced area.

(h) A permanent flow measuring device shall be installed. Flow measurement devices such as critical depth meters or weirs shall be properly housed and otherwise protected.

(i) The spring shall be developed as thoroughly as possible so as to minimize the possibility of excess spring water ponding within the collection area. Where the ponding of spring water is unavoidable, the excess shall be collected by shallow piping or french drain and be routed beyond and down grade of the fenced area required above, whether or not a fence is in place.

R309-515-8. Operation and Maintenance.

(1) Spring Collection Area Maintenance.

(a) Spring collection areas shall be periodically (preferably annually) cleared of deep rooted vegetation to prevent root growth from clogging collection lines. Frequent hand or mechanical clearing of spring collection areas and diversion channel is strongly recommended. It is advantageous to encourage the growth of grasses and other shallow rooted vegetation for erosion control and to inhibit the growth of more detrimental flora.

(b) No pesticide (e.g., herbicide) may be applied on a spring collection area without the prior written approval of the Executive Secretary. Such approval shall be given 1) only when acceptable pesticides are proposed; 2) when the pesticide product manufacturer certifies that no harmful substance will be imparted to the water; and 3) only when spring development construction meets the requirements of these rules.

(2) Pump Lubricants.

The U.S. Food and Drug Administration (FDA) has approved propylene glycol and certain types of mineral oil for occasional contact with or for addition to food products. These oils are commonly referred to as "food-grade mineral oils". All oil lubricated pumps shall utilize food grade mineral oil suitable for

human consumption as determined by the Executive Secretary.

(3) Algicide Treatment.

No algicide shall be applied to a drinking water source unless specific approval is obtained from the Division. Such approval will be given only if the algicide is certified as meeting the requirements of ANSI/NSF Standard 60, Water Treatment Chemicals - Health Effects.

KEY: drinking water, source development, source maintenance
Date of Enactment or Last Substantive Amendment: April 21, 2004
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-520. Facility Design and Operation: Disinfection.
R309-520-1. Purpose.

This rule specifies requirements for facilities which disinfect public drinking water. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-520-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63, Chapter 46a of the same, known as the Administrative Rulemaking Act.

R309-520-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-520-4. General.

Continuous disinfection shall be required of all ground water sources not consistently meeting standards of bacteriologic quality. Surface water sources or ground water sources under direct influence of surface water shall be disinfected during the course of required conventional surface water treatment or alternative surface water treatment. Disinfection shall not be considered a substitute for inadequate collection facilities. Systems having only sources classified as ground water (see R309-505-8 [~~202-8~~]) and which disinfect shall meet the requirements of R309-105-10(1) [~~102-4.1~~].

R309-520-5. Allowable Primary Disinfectants.

Primary disinfection is defined as the means for providing adequate levels of inactivation of pathogenic micro organisms within the treatment process. Its effectiveness is measured through the "CT" values. Only three disinfectants; chlorine (gaseous and liquid hypochlorites), ozone, and chlorine dioxide are allowable for primary disinfection.

R309-520-6. Allowable Secondary Disinfectants.

Secondary disinfection is intended to provide an adequate disinfectant residual in the distribution system to maintain the bacteriological quality of treated water. Its effectiveness is measured through maintaining a detectable disinfectant residual throughout the distribution system. Allowable disinfectants are chlorine (gaseous and liquid hypochlorites), chloramine, and chlorine dioxide.

R309-520-7. Appropriate Uses of Chemical Disinfectants.

Chemical disinfection alone is appropriate only for groundwater not under the influence of surface water. Surface water, or groundwater under the direct influence of surface water, shall be coagulated and filtered in addition to being disinfected. For criteria to be used in determining required levels of treatment refer to R309-103-2.7.

R309-520-8. Required Chemical Dosing and Contact Time.

Minimum levels for primary and secondary disinfection are specified in R309-103-2.7.

R309-520-9. Siting.

Disinfection installations shall be sited to permit convenient access through the entire year as well as considerations of safety (i.e. proximity to population or seismic fault zones).

R309-520-10. Chlorine.

(1) General Requirements for all Chlorination Installations.

(a) Chemical Types.

Disinfection by chlorination shall be accomplished by gaseous chlorine or liquid solutions of calcium or sodium hypochlorites.

(b) Feeding Equipment.

Solution-feed gas type chlorinators, direct-feed gas type chlorinators or hypochlorite liquid feeders of a positive displacement type shall be provided. Solution-feed gas type chlorinators are preferred. However, for small supplies requiring less than four pounds per day, liquid hypochlorinators are advised.

(c) Chlorine Feed Capacity.

The design of each chlorinator shall permit:

(i) the chlorinator capacity to be such that a free chlorine residual of at least 2 mg/l can be maintained in the system after 30 minutes of contact time during peak demand. The equipment shall be of such design that it will operate accurately over a feeding range of 0.2 mg/l to 2 mg/l.

(ii) assurance that a detectable residual, either combined or free, can be maintained at all times, at all points in the distribution system.

(d) Automatic Proportioning.

Automatic proportioning chlorinators shall be required where the rate of flow or chlorine demand is not reasonably constant.

(e) Injector/diffuser.

The chlorine solution injector/diffuser shall be compatible with the point of application to provide a rapid and thorough mix with all the water being treated. The center of a pipeline is the preferred application point.

(f) Contact Time and Point of Application.

(i) Due consideration shall be given to the contact time of the chlorine in water with relation to pH, ammonia, taste producing substances, temperature, biological quality, and other pertinent factors.

(ii) Where possible, the design shall minimize the formation of chloro-organic compounds. At plants treating surface water or

ground water under the direct influence of surface water, provisions shall be made for applying chlorine to raw water, applied water, filtered water, and water entering the distribution system.

(iii) When treating ground water, provisions shall be made for applying chlorine to at least a reservoir inlet or transmission pipeline which will provide maximum contact time.

(iv) Care must be taken to assure that the point of application will, in conjunction with the pipe and tank configuration of the water system, allow required CT values to be achieved prior to the first consumer connection.

(g) Minimization of Chlorinated Overflow.

The chlorinator and associated water delivery facilities shall be designed so as to minimize the unnecessary release of chlorinated water into the environment from tank overflows (see also rules of Division of Water Quality pertaining to discharge or pollution).

(h) Chlorinator Piping.

The chlorinator water supply piping shall be designed to prevent contamination of the treated water supply by sources of questionable quality. At all facilities treating surface water, pre- and post-chlorination systems shall be independent where solution water is not finished water. All chlorinator solution water shall be at least of equal quality to the water receiving the chlorine solution.

(i) Water Measurement.

A means to measure water flow to be treated shall be provided.

(j) Residual Testing Equipment.

Chlorine residual test equipment recognized in the latest edition of "Standard Methods for the Examination of Water and Wastewater" shall be provided and shall be capable of measuring residuals to the nearest 0.1 mg/l in the range below 0.5 mg/l, to the nearest 0.3 mg/l between 0.5 mg/l and 1.0 mg/l and to the nearest 0.5 mg/l above 1.0 mg/l.

(k) Standby and Backup Equipment.

A spare parts kit shall be provided and maintained for all chlorinators to repair parts subject to wear and breakage. If there is a large difference in feed rates between routine and emergency dosages, a gas metering tube shall be provided for each dose range to ensure accurate control of the chlorine feed. Where chlorination is required for protection of the supply, standby equipment of sufficient capacity shall be available to replace the largest unit. Standby power shall be available, during power outages, for operation of chlorinators where protection of the supply is required.

(l) Heating, Lighting, Ventilation.

Chlorinator houses shall be heated, lighted and ventilated as necessary to assure proper operation of the equipment, and serviceability.

(m) Bypass Capability.

A chlorinator bypass shall be provided for periods during chlorinator servicing and power outages.

(2) Additional Requirement for Gas Chlorinators.

(a) Automatic Switch over.

Automatic Switch over of chlorine cylinders shall be provided, where necessary, to assure continuous disinfection.

(b) Injector.

Each injector shall be selected for the point of application with particular attention given to the quantity of chlorine to be added, the maximum injector waterflow, the total discharge back pressure, the injector operating pressure, and the size of the chlorine solution line. Gauges for measuring water pressure at the inlet and outlet of each injector shall be provided.

(c) Gas Scrubbers.

Gas chlorine facilities shall conform with the Uniform Fire Code, Article 80 and the Uniform Building Code, Chapter 9 as they are applied by local jurisdictions in the state. Furthermore, local toxic gas ordinances shall be complied with if they exist.

(d) Heat.

The design of the chlorination room shall assure that the temperature in the room will never fall below 32 degrees F or that temperature required for proper operation of the chlorinator, whichever is greater.

(e) Ventilation.

Chlorination equipment rooms which contain cylinders or equipment and lines with gaseous chlorine under pressure shall be vented such that:

(i) when fan(s) are operating, suction will provide one complete room air change per minute;

(ii) the ventilating fan(s) take suction near the floor, as far as practical from the door and air inlet, with the point of discharge so located as not to contaminate air inlets of any rooms or structures;

(iii) air inlets are through louvers near the ceiling;

(iv) louvers for chlorine room air intake and exhaust facilitate airtight closure;

(iv) separate switches for the fans and lights are outside of the room, at the entrance to the chlorination equipment room. Outside switches shall be protected from vandalism;

(v) vents from feeders and storage discharge above grade to the outside atmosphere; and

(vi) floor drains are discouraged. Where provided, the floor drains shall discharge to the outside of the building and shall not be connected to other internal or external drainage systems.

(f) Feeder Vent Hose.

The vent hose from the feeder shall discharge to the outside atmosphere above grade at a point least susceptible to vandalism and shall have the end covered with a No. 14 mesh non-corrodible screen.

(g) Housing.

Adequate housing shall be provided for the chlorination equipment and for storing the chlorine (see R309-520-10(1)(l) above).

(h) Housing at Water Treatment Plants.

Separate rooms for cylinders and feed equipment shall be provided at all water treatment plants. Chlorine gas feed and

storage shall be enclosed and separated from other operating areas. The chlorine room shall be:

(i) provided with a shatter resistant inspection window installed in an interior wall and preferably located so that an operator may read the weighing scales without entering the chlorine room,

(ii) constructed in a manner that all openings between the chlorine room and the remainder of the plant are sealed, and

(iii) provided with doors equipped with panic hardware assuring ready means of exit and opening only to the building exterior.

(i) Cylinder Security.

Full and empty cylinders of chlorine gas shall be:

(i) isolated from operating areas;

(ii) restrained in position to prevent upset from accidental bumping or a seismic event;

(iii) stored in rooms separated from ammonia storage; and

(iv) stored in areas not in direct sunlight or exposed to excessive heat.

(j) Feed Line Routing.

Chlorine feed lines shall not carry pressurized chlorine gas beyond the chlorinator room. Only vacuum lines may be routed to other portions of the building outside the chlorine room and any openings for these lines must be adequately sealed.

(k) Weighing Scales.

Scales shall be provided for weighing cylinders. Scales should be of a corrosion resistant material and should be placed in a location remote from any moisture. Scales shall be accurate enough to indicate loss of weight to the nearest one pound for 150 pound cylinders and to the nearest 10 pounds for one ton cylinders.

(l) Pressure Gauges.

Pressure gauges shall be provided on the inlet and outlet of each chlorine injector as indicated in R309-520-10(2)(b). The preferred location is on the water feed line immediately before the inlet of the chlorine injector and at a point on the water main just ahead of chlorine injection. These locations should give accurate pressure readings while not being subjected to corrosive chlorinated water.

(m) Injector Protection.

A suitable screen to prevent small debris from clogging a chlorine injector shall be provided on the water feed line. Provision for flushing of the screen is required.

(n) Chlorine Vent Line Protection.

A non-corrodible fine mesh (No. 14 or finer) screen shall be placed over the discharge ends of all vent lines. All vent lines shall discharge to the outside atmosphere above grade and at locations least susceptible to vandalism.

(o) Gas Masks.

(i) Respiratory protection equipment, meeting the requirements of the National Institute for Occupational Safety and Health (NIOSH) shall be available where chlorine gas in one-ton cylinders is handled, and shall be stored at a convenient location, but not inside any room where chlorine is used or

stored. The units shall use compressed air, have at least a 30 minute capacity, and be compatible with or exactly the same as units used by the fire department responsible for the plant.

(ii) Where smaller chlorine cylinders are used, suitable gas masks must be provided.

(p) Chlorine Leak Detection and Repair.

A bottle of Ammonium Hydroxide, 56% ammonia solution, shall be available for chlorine leak detection; where ton containers are used, a leak repair kit approved by the Chlorine Institute shall be provided. Continuous chlorine leak detection equipment is recommended. Where a leak detector is provided, it shall be equipped with both an audible alarm and a warning light.

R309-520-11. Ozone.

Proposals for use of ozone disinfection shall be discussed with the Division prior to the preparation of final plans and specifications.

Interim Standard - Ozonation, page xxxi, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and shall govern the design and operation of disinfection facilities utilizing ozone. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-520-12. Chlorine Dioxide.

Proposals for the use of Chlorine Dioxide as a disinfectant shall be discussed with the Division prior to the preparation of final plans and specifications. The "CT" values for the inactivation of Giardia cysts using chlorine dioxide are independent of pH, with only temperature affecting the value. For chlorine dioxide, a 3-log inactivation of Giardia cysts will generally result in greater than 4-log virus inactivation, and assure meeting requirements. However, for chlorine dioxide, unlike chlorine where this relationship always hold true, at certain temperatures, the 4-log virus CT may be higher than the 3-log Giardia cyst CT.

R309-520-13. Chloramines.

Proposals for the use of Chloramines as a disinfectant shall be discussed with the Division prior to the preparation of final plans and specifications.

R309-520-14. Ultraviolet Light.

(1) Proposals for use of ultraviolet disinfection shall be discussed with the Division prior to the preparation of final plans and specifications.

(2) Secondary disinfection and maintenance of the required residual will be necessary where disinfection of the supply is required.

(3) Ultraviolet disinfection will be permitted where the design conforms to the minimum recommendations of the U.S. Public Health Service listed below.

(a) Ultraviolet radiation at a level of 2,537 Angstrom units must be applied at a minimum dosage of 16,000 microwatt-seconds per square centimeter per second (1,600 Finsen Units) at all points throughout the water disinfection chamber.

(b) Maximum water depth in the chamber, measured from the tub surface to the chamber wall, shall not exceed three inches.

(c) The ultraviolet tubes shall be:

(i) jacketed so that a proper operating tube temperature of about 105 degrees F is maintained; and

(ii) the jacket shall be of quartz or high silica glass with similar optical characteristics.

(d) A flow or time delay mechanism shall be provided to permit a two minute tube warm-up period before water flows from the unit.

(e) The unit shall be designed to permit frequent mechanical cleaning of the water contact surface of the jacket without disassembly of the unit.

(f) An automatic flow control valve, accurate within the expected pressure range, shall be installed to restrict flow to the maximum design flow of the treatment unit.

(g) An accurately calibrated ultraviolet intensity meter, properly filtered to restrict its sensitivity to the disinfection spectrum, shall be installed in the wall of the disinfection chamber at the point of greatest water depth from the tube or tubes.

(h) A diversion valve or automatic shut-off valve shall be installed which will permit flow into the finished drinking water system only when at least the minimum ultraviolet dosage is applied. When power is not being supplied to the unit, the valve should be in a closed position which prevents the flow of water into the finished drinking water system.

(i) An automatic, audible alarm shall be installed to warn of malfunction or impending shutdown.

(j) The materials of construction shall not impart toxic materials into the water either as a result of the presence of toxic constituents in materials of construction or as a result of physical or chemical changes resulting from exposure to ultraviolet energy.

(k) The unit shall be designed to protect the operator against electrical shock or excessive radiation.

(l) As with any drinking water treatment process, due consideration must be given to the reliability, economics, and competent operation of the disinfection process and related equipment, including:

(i) installation of the unit in a protected enclosure not subject to extremes of temperature which could cause malfunction; and

(ii) provision of a spare UV tube and other necessary equipment to effect prompt repair by qualified personnel properly instructed in the operation and maintenance of the equipment.

R309-520-15. Operation and Maintenance.

(1) Safety.

Chlorine gas facilities shall be operated in a manner which

minimizes risks to water system personnel or the general public.

(2) Residual Chlorine.

Public drinking water systems supplied water from conventional surface water treatment or alternatives shall test for detectable chlorine residual or HPC within the distribution system as outlined in R309-104-4.7.4c.

(3) Chlorine Dosing.

Chlorine, when used in the distribution system, shall be added in sufficient quantity to achieve either "breakpoint" and yield a detectable free chlorine residual or a detectable combined chlorine residual in the distribution system at points to be determined by the Executive Secretary. Residual checks must be taken daily by the operator of any system using disinfectants. The Executive Secretary may, however, reduce the frequency of residual checks if he determines that this would be an unwarranted hardship on the water system operator and, furthermore, the disinfection equipment has a verified record of reliable operation. Suppliers, when checking for residuals, must use test kits and methods which meet the requirements of the U.S. EPA. The "DPD" test method is recommended for free chlorine residuals. Information on the suppliers of this equipment is available from the Division.

(4) ANSI/NSF Standard 60 Certification.

All chemicals, including chlorine gas, added to drinking water supplied by a public water system shall be certified as complying with ANSI/NSF Standard 60, Drinking Water Treatment Chemicals.

KEY: drinking water, primary disinfectants, secondary disinfectants, operation and maintenance
Date of Enactment or Last Substantive Amendment: August 15, 2000
Notice of Continuation: March 13, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-520. Facility Design and Operation: Disinfection.
R309-520-1. Purpose.

This rule specifies requirements for facilities which disinfect public drinking water. It is intended to be applied in conjunction with R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-520-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with Title 63, Chapter 46a of the same, known as the Administrative Rulemaking Act.

R309-520-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-520-4. General.

Continuous disinfection shall be required of all ground water sources not consistently meeting standards of bacteriologic quality. Surface water sources or ground water sources under direct influence of surface water shall be disinfected during the course of required conventional surface water treatment or alternative surface water treatment. Disinfection shall not be considered a substitute for inadequate collection facilities. Systems having only sources classified as ground water (see R309-505-8 [~~202-8~~]) and which disinfect shall meet the requirements of R309-105-10(1) [~~102-4.1~~].

R309-520-5. Allowable Primary Disinfectants.

Primary disinfection is defined as the means for providing adequate levels of inactivation of pathogenic micro organisms within the treatment process. Its effectiveness is measured through the "CT" values. Only three disinfectants; chlorine (gaseous and liquid hypochlorites), ozone, and chlorine dioxide are allowable for primary disinfection.

R309-520-6. Allowable Secondary Disinfectants.

Secondary disinfection is intended to provide an adequate disinfectant residual in the distribution system to maintain the bacteriological quality of treated water. Its effectiveness is measured through maintaining a detectable disinfectant residual throughout the distribution system. Allowable disinfectants are chlorine (gaseous and liquid hypochlorites), chloramine, and chlorine dioxide.

R309-520-7. Appropriate Uses of Chemical Disinfectants.

Chemical disinfection alone is appropriate only for groundwater not under the influence of surface water. Surface water, or groundwater under the direct influence of surface water, shall be coagulated and filtered in addition to being disinfected. For criteria to be used in determining required levels of treatment refer to R309-103-2.7.

R309-520-8. Required Chemical Dosing and Contact Time.

Minimum levels for primary and secondary disinfection are specified in R309-103-2.7.

R309-520-9. Siting.

Disinfection installations shall be sited to permit convenient access through the entire year as well as considerations of safety (i.e. proximity to population or seismic fault zones).

R309-520-10. Chlorine.

(1) General Requirements for all Chlorination Installations.

(a) Chemical Types.

Disinfection by chlorination shall be accomplished by gaseous chlorine or liquid solutions of calcium or sodium hypochlorites.

(b) Feeding Equipment.

Solution-feed gas type chlorinators, direct-feed gas type chlorinators or hypochlorite liquid feeders of a positive displacement type shall be provided. Solution-feed gas type chlorinators are preferred. However, for small supplies requiring less than four pounds per day, liquid hypochlorinators are advised.

(c) Chlorine Feed Capacity.

The design of each chlorinator shall permit:

(i) the chlorinator capacity to be such that a free chlorine residual of at least 2 mg/l can be maintained in the system after 30 minutes of contact time during peak demand. The equipment shall be of such design that it will operate accurately over a feeding range of 0.2 mg/l to 2 mg/l.

(ii) assurance that a detectable residual, either combined or free, can be maintained at all times, at all points in the distribution system.

(d) Automatic Proportioning.

Automatic proportioning chlorinators shall be required where the rate of flow or chlorine demand is not reasonably constant.

(e) Injector/diffuser.

The chlorine solution injector/diffuser shall be compatible with the point of application to provide a rapid and thorough mix with all the water being treated. The center of a pipeline is the preferred application point.

(f) Contact Time and Point of Application.

(i) Due consideration shall be given to the contact time of the chlorine in water with relation to pH, ammonia, taste producing substances, temperature, biological quality, and other pertinent factors.

(ii) Where possible, the design shall minimize the formation of chloro-organic compounds. At plants treating surface water or

ground water under the direct influence of surface water, provisions shall be made for applying chlorine to raw water, applied water, filtered water, and water entering the distribution system.

(iii) When treating ground water, provisions shall be made for applying chlorine to at least a reservoir inlet or transmission pipeline which will provide maximum contact time.

(iv) Care must be taken to assure that the point of application will, in conjunction with the pipe and tank configuration of the water system, allow required CT values to be achieved prior to the first consumer connection.

(g) Minimization of Chlorinated Overflow.

The chlorinator and associated water delivery facilities shall be designed so as to minimize the unnecessary release of chlorinated water into the environment from tank overflows (see also rules of Division of Water Quality pertaining to discharge or pollution).

(h) Chlorinator Piping.

The chlorinator water supply piping shall be designed to prevent contamination of the treated water supply by sources of questionable quality. At all facilities treating surface water, pre- and post-chlorination systems shall be independent where solution water is not finished water. All chlorinator solution water shall be at least of equal quality to the water receiving the chlorine solution.

(i) Water Measurement.

A means to measure water flow to be treated shall be provided.

(j) Residual Testing Equipment.

Chlorine residual test equipment recognized in the latest edition of "Standard Methods for the Examination of Water and Wastewater" shall be provided and shall be capable of measuring residuals to the nearest 0.1 mg/l in the range below 0.5 mg/l, to the nearest 0.3 mg/l between 0.5 mg/l and 1.0 mg/l and to the nearest 0.5 mg/l above 1.0 mg/l.

(k) Standby and Backup Equipment.

A spare parts kit shall be provided and maintained for all chlorinators to repair parts subject to wear and breakage. If there is a large difference in feed rates between routine and emergency dosages, a gas metering tube shall be provided for each dose range to ensure accurate control of the chlorine feed. Where chlorination is required for protection of the supply, standby equipment of sufficient capacity shall be available to replace the largest unit. Standby power shall be available, during power outages, for operation of chlorinators where protection of the supply is required.

(l) Heating, Lighting, Ventilation.

Chlorinator houses shall be heated, lighted and ventilated as necessary to assure proper operation of the equipment, and serviceability.

(m) Bypass Capability.

A chlorinator bypass shall be provided for periods during chlorinator servicing and power outages.

(2) Additional Requirement for Gas Chlorinators.

(a) Automatic Switch over.

Automatic Switch over of chlorine cylinders shall be provided, where necessary, to assure continuous disinfection.

(b) Injector.

Each injector shall be selected for the point of application with particular attention given to the quantity of chlorine to be added, the maximum injector waterflow, the total discharge back pressure, the injector operating pressure, and the size of the chlorine solution line. Gauges for measuring water pressure at the inlet and outlet of each injector shall be provided.

(c) Gas Scrubbers.

Gas chlorine facilities shall conform with the Uniform Fire Code, Article 80 and the Uniform Building Code, Chapter 9 as they are applied by local jurisdictions in the state. Furthermore, local toxic gas ordinances shall be complied with if they exist.

(d) Heat.

The design of the chlorination room shall assure that the temperature in the room will never fall below 32 degrees F or that temperature required for proper operation of the chlorinator, whichever is greater.

(e) Ventilation.

Chlorination equipment rooms which contain cylinders or equipment and lines with gaseous chlorine under pressure shall be vented such that:

(i) when fan(s) are operating, suction will provide one complete room air change per minute;

(ii) the ventilating fan(s) take suction near the floor, as far as practical from the door and air inlet, with the point of discharge so located as not to contaminate air inlets of any rooms or structures;

(iii) air inlets are through louvers near the ceiling;

(iv) louvers for chlorine room air intake and exhaust facilitate airtight closure;

(iv) separate switches for the fans and lights are outside of the room, at the entrance to the chlorination equipment room. Outside switches shall be protected from vandalism;

(v) vents from feeders and storage discharge above grade to the outside atmosphere; and

(vi) floor drains are discouraged. Where provided, the floor drains shall discharge to the outside of the building and shall not be connected to other internal or external drainage systems.

(f) Feeder Vent Hose.

The vent hose from the feeder shall discharge to the outside atmosphere above grade at a point least susceptible to vandalism and shall have the end covered with a No. 14 mesh non-corrodible screen.

(g) Housing.

Adequate housing shall be provided for the chlorination equipment and for storing the chlorine (see R309-520-10(1)(l) above).

(h) Housing at Water Treatment Plants.

Separate rooms for cylinders and feed equipment shall be provided at all water treatment plants. Chlorine gas feed and

storage shall be enclosed and separated from other operating areas. The chlorine room shall be:

(i) provided with a shatter resistant inspection window installed in an interior wall and preferably located so that an operator may read the weighing scales without entering the chlorine room,

(ii) constructed in a manner that all openings between the chlorine room and the remainder of the plant are sealed, and

(iii) provided with doors equipped with panic hardware assuring ready means of exit and opening only to the building exterior.

(i) Cylinder Security.

Full and empty cylinders of chlorine gas shall be:

(i) isolated from operating areas;

(ii) restrained in position to prevent upset from accidental bumping or a seismic event;

(iii) stored in rooms separated from ammonia storage; and

(iv) stored in areas not in direct sunlight or exposed to excessive heat.

(j) Feed Line Routing.

Chlorine feed lines shall not carry pressurized chlorine gas beyond the chlorinator room. Only vacuum lines may be routed to other portions of the building outside the chlorine room and any openings for these lines must be adequately sealed.

(k) Weighing Scales.

Scales shall be provided for weighing cylinders. Scales should be of a corrosion resistant material and should be placed in a location remote from any moisture. Scales shall be accurate enough to indicate loss of weight to the nearest one pound for 150 pound cylinders and to the nearest 10 pounds for one ton cylinders.

(l) Pressure Gauges.

Pressure gauges shall be provided on the inlet and outlet of each chlorine injector as indicated in R309-520-10(2)(b). The preferred location is on the water feed line immediately before the inlet of the chlorine injector and at a point on the water main just ahead of chlorine injection. These locations should give accurate pressure readings while not being subjected to corrosive chlorinated water.

(m) Injector Protection.

A suitable screen to prevent small debris from clogging a chlorine injector shall be provided on the water feed line. Provision for flushing of the screen is required.

(n) Chlorine Vent Line Protection.

A non-corrodible fine mesh (No. 14 or finer) screen shall be placed over the discharge ends of all vent lines. All vent lines shall discharge to the outside atmosphere above grade and at locations least susceptible to vandalism.

(o) Gas Masks.

(i) Respiratory protection equipment, meeting the requirements of the National Institute for Occupational Safety and Health (NIOSH) shall be available where chlorine gas in one-ton cylinders is handled, and shall be stored at a convenient location, but not inside any room where chlorine is used or

stored. The units shall use compressed air, have at least a 30 minute capacity, and be compatible with or exactly the same as units used by the fire department responsible for the plant.

(ii) Where smaller chlorine cylinders are used, suitable gas masks must be provided.

(p) Chlorine Leak Detection and Repair.

A bottle of Ammonium Hydroxide, 56% ammonia solution, shall be available for chlorine leak detection; where ton containers are used, a leak repair kit approved by the Chlorine Institute shall be provided. Continuous chlorine leak detection equipment is recommended. Where a leak detector is provided, it shall be equipped with both an audible alarm and a warning light.

R309-520-11. Ozone.

Proposals for use of ozone disinfection shall be discussed with the Division prior to the preparation of final plans and specifications.

Interim Standard - Ozonation, page xxxi, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and shall govern the design and operation of disinfection facilities utilizing ozone. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-520-12. Chlorine Dioxide.

Proposals for the use of Chlorine Dioxide as a disinfectant shall be discussed with the Division prior to the preparation of final plans and specifications. The "CT" values for the inactivation of Giardia cysts using chlorine dioxide are independent of pH, with only temperature affecting the value. For chlorine dioxide, a 3-log inactivation of Giardia cysts will generally result in greater than 4-log virus inactivation, and assure meeting requirements. However, for chlorine dioxide, unlike chlorine where this relationship always hold true, at certain temperatures, the 4-log virus CT may be higher than the 3-log Giardia cyst CT.

R309-520-13. Chloramines.

Proposals for the use of Chloramines as a disinfectant shall be discussed with the Division prior to the preparation of final plans and specifications.

R309-520-14. Ultraviolet Light.

(1) Proposals for use of ultraviolet disinfection shall be discussed with the Division prior to the preparation of final plans and specifications.

(2) Secondary disinfection and maintenance of the required residual will be necessary where disinfection of the supply is required.

(3) Ultraviolet disinfection will be permitted where the design conforms to the minimum recommendations of the U.S. Public Health Service listed below.

(a) Ultraviolet radiation at a level of 2,537 Angstrom units must be applied at a minimum dosage of 16,000 microwatt-seconds per square centimeter per second (1,600 Finsen Units) at all points throughout the water disinfection chamber.

(b) Maximum water depth in the chamber, measured from the tub surface to the chamber wall, shall not exceed three inches.

(c) The ultraviolet tubes shall be:

(i) jacketed so that a proper operating tube temperature of about 105 degrees F is maintained; and

(ii) the jacket shall be of quartz or high silica glass with similar optical characteristics.

(d) A flow or time delay mechanism shall be provided to permit a two minute tube warm-up period before water flows from the unit.

(e) The unit shall be designed to permit frequent mechanical cleaning of the water contact surface of the jacket without disassembly of the unit.

(f) An automatic flow control valve, accurate within the expected pressure range, shall be installed to restrict flow to the maximum design flow of the treatment unit.

(g) An accurately calibrated ultraviolet intensity meter, properly filtered to restrict its sensitivity to the disinfection spectrum, shall be installed in the wall of the disinfection chamber at the point of greatest water depth from the tube or tubes.

(h) A diversion valve or automatic shut-off valve shall be installed which will permit flow into the finished drinking water system only when at least the minimum ultraviolet dosage is applied. When power is not being supplied to the unit, the valve should be in a closed position which prevents the flow of water into the finished drinking water system.

(i) An automatic, audible alarm shall be installed to warn of malfunction or impending shutdown.

(j) The materials of construction shall not impart toxic materials into the water either as a result of the presence of toxic constituents in materials of construction or as a result of physical or chemical changes resulting from exposure to ultraviolet energy.

(k) The unit shall be designed to protect the operator against electrical shock or excessive radiation.

(l) As with any drinking water treatment process, due consideration must be given to the reliability, economics, and competent operation of the disinfection process and related equipment, including:

(i) installation of the unit in a protected enclosure not subject to extremes of temperature which could cause malfunction; and

(ii) provision of a spare UV tube and other necessary equipment to effect prompt repair by qualified personnel properly instructed in the operation and maintenance of the equipment.

R309-520-15. Operation and Maintenance.

(1) Safety.

Chlorine gas facilities shall be operated in a manner which

minimizes risks to water system personnel or the general public.

(2) Residual Chlorine.

Public drinking water systems supplied water from conventional surface water treatment or alternatives shall test for detectable chlorine residual or HPC within the distribution system as outlined in R309-104-4.7.4c.

(3) Chlorine Dosing.

Chlorine, when used in the distribution system, shall be added in sufficient quantity to achieve either "breakpoint" and yield a detectable free chlorine residual or a detectable combined chlorine residual in the distribution system at points to be determined by the Executive Secretary. Residual checks must be taken daily by the operator of any system using disinfectants. The Executive Secretary may, however, reduce the frequency of residual checks if he determines that this would be an unwarranted hardship on the water system operator and, furthermore, the disinfection equipment has a verified record of reliable operation. Suppliers, when checking for residuals, must use test kits and methods which meet the requirements of the U.S. EPA. The "DPD" test method is recommended for free chlorine residuals. Information on the suppliers of this equipment is available from the Division.

(4) ANSI/NSF Standard 60 Certification.

All chemicals, including chlorine gas, added to drinking water supplied by a public water system shall be certified as complying with ANSI/NSF Standard 60, Drinking Water Treatment Chemicals.

KEY: drinking water, primary disinfectants, secondary disinfectants, operation and maintenance
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R309. Environmental Quality, Drinking Water.
R309-525. Facility Design and Operation: Conventional Surface Water Treatment.
R309-525-1. Purpose.

This rule specifies requirements for conventional surface water treatment plants used in public water systems. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-525-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-525-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-525-4. General.

(1) Treatment plants used for the purification of surface water supplies or ground water supplies under direct influence of surface water must conform to the requirements given herein. The plants shall have, as a minimum, facilities for flash mixing of coagulant chemicals, flocculation, sedimentation, filtration and disinfection.

(2) The overall design of a water treatment facility must be carefully examined to assure the compatibility of all devices and processes. The design of treatment processes and devices shall depend on an evaluation of the nature and quality of the particular water to be treated. The combined unit processes shall produce water meeting all established drinking water standards as given in R309-200.

(3) Direct filtration may be acceptable and rules governing this method are given in R309-530-5.

(4) Refer to R309-530-9 for policy with regards to novel water treatment equipment or techniques which may depart from the requirements outlined herein.

R309-525-5. Plant Capacity and Number of Treatment Trains.

(1) A determination of the required plant capacity and the required number of treatment trains shall be made after consultation with the Division. Ordinarily, a minimum of two units each for flocculation, sedimentation and filtration must be provided. The design shall provide for parallel or series operation of the clarification stages. Flash mix shall be designed and operated to provide a minimum velocity gradient of 750 fps/ft. Mixing time shall be less than thirty seconds. The

treatment plant shall be designed to meet the anticipated "peak day demand" of the system being served when the treatment plant is the system's sole source. When other sources are available to the system, this requirement may be relaxed.

(2) The degree of "back-up" required in a water treatment plant will vary with the number of connections to be served, the availability of other acceptable sources of water, and the ability to control water consumption. Thus, when other sources are available to the system, the requirements of R309-525-7 (Plant Reliability) may also be relaxed. The Division shall be consulted in this regard prior to plant design.

R309-525-6. Plant Siting.

Plants must be sited with due regard for earthquake, flood, and fire hazard. Assistance in this matter is available from the Utah Geologic Survey. The Division shall be consulted regarding site selection prior to the preparation of engineering plans and specifications.

R309-525-7. Plant Reliability.

Plants designed for processing surface water or ground water under direct influence of surface water shall be designed to meet present and future water demands and assure reliable operation at all times. To help assure proper, uninterrupted operation:

(1) A manual override shall be provided for any automatic controls. Highly sophisticated automation may put proper maintenance beyond the capability of the plant operator, leading to equipment breakdowns or expensive servicing. Adequate funding must be assured for maintenance of automatic equipment.

(2) Main switch electrical controls shall be located above grade, in areas not subject to flooding.

(3) Plants shall be operated by qualified personnel approved by the Executive Secretary. As a minimum, the treatment plant manager is required to be certified in accordance with R309-300 at the grade of the waterworks system with an appropriate unrestricted Utah Operator's Certificate.

(4) The plant shall be constructed to permit units to be taken out of service without disrupting operation, and with drains or pumps sized to allow dewatering in a reasonable period of time.

(5) The plant shall have standby power available to permit operation of essential functions during power outages,

(6) The plant shall be provided with backup equipment or necessary spare parts for all critical items.

(7) Individual components critical to the operation of a treatment plant shall be provided with anchorage to secure the components from loss due to an earthquake event.

R309-525-8. Color Coding and Pipe Marking.

The piping in water treatment plants shall be color coded for identification. The following table contains color schemes recommended by the Division. Identification of the direction of flow and the contained liquid shall also be made on the pipe.

TABLE 525-1

Recommended Color Scheme for Piping

Water Lines	
Raw	Olive Green
Settled or Clarified	Aquamarine
Finished	Dark Blue
Chemical Lines	
Alum	Orange
Ammonia	White
Carbon Slurry	Black
Chorine (Gas and Solution)	Yellow
Fluoride	Light Blue with Red Band
Lime Slurry	Light Green
Potassium Permanganate	Violet
Sulfur Dioxide	Light Green with Yellow Band
Waste lines	
Backwash Waste	Light Brown
Sludge	Dark Brown
Sewer (Sanitary or Other)	Dark Gray
Other	
Compressed Air	Dark Green
Gas	Red
Other Lines	Light Gray

R309-525-9. Diversion Structures and Pretreatment.

Refer to R309-515-5(5) for diversion structure design.

R309-525-10. Presedimentation.

Waters containing, heavy grit, sand, gravel, leaves, debris, or a large volume of sediments may require pretreatment, usually sedimentation, with or without the addition of coagulation chemicals.

(1) Presedimentation basins shall be equipped for efficient sludge removal.

(2) Incoming water shall be dispersed across the full width of the line of travel as efficiently as practical. Short-circuiting shall be minimized.

(3) Provisions for bypassing presedimentation basins shall be included.

R309-525-11. Chemical Addition.

(1) Goals.

Chemicals used in the treatment of surface water shall achieve the following:

(a) Primary coagulant chemicals shall be utilized to permit the formation of a floc,

(b) Disinfectants shall be added to raw and/or treated water.

(2) Application Criteria.

In achieving these goals the chemical(s) shall be applied to the water:

(a) To assure maximum control and flexibility of treatment,

(b) To assure maximum safety to consumer and operators,

(c) To prevent backflow or back-siphonage of chemical solutions to finished water systems.

(d) With appropriate spacing of chemical feed to eliminate any interference between chemicals.

(3) Typical Chemical Doses.

Chemical doses shall be estimated for each treatment plant to be designed. "Jar tests" shall be conducted on representative raw water samples to determine anticipated doses.

(4) Information Required for Review.

With respect to chemical applications, a submittal for Division review shall include:

(a) Descriptions of feed equipment, including maximum and minimum feed rates,

(b) Location of feeders, piping layout and points of application,

(c) Chemical storage and handling facilities,

(d) Specifications for chemicals to be used,

(e) Operating and control procedures including proposed application rates,

(f) Descriptions of testing equipment and procedures, and

(g) Results of chemical, physical, biological and other tests performed as necessary to define the optimum chemical treatment.

(5) Quality of Chemicals.

All chemicals added to water being treated for use in a public water system for human consumption shall comply with ANSI/NSF Standard 60. Evidence for this requirement shall be met if the chemical shipping container labels or material safety data sheets include:

(a) Chemical name, purity and concentrations, Supplier name and address, and

(b) Labeling indicating compliance with ANSI/NSF Standard 60.

(6) Storage, Safe Handling and Ventilation of Chemicals.

All requirements of the Utah Occupational Safety and Health Act (UOSHA) for storage, safe handling and ventilation of chemicals shall apply to public drinking water facilities. The designer shall incorporate all applicable UOSHA standards into the facility design, however, review of facility plans by the Division of Drinking Water under this Rule shall be limited to the following requirements:

(a) Storage of Chemicals.

(i) Space shall be provided for:

(A) An adequate supply of chemicals,

(B) Convenient and efficient handling of chemicals,

(C) Dry storage conditions.

(ii) Storage tanks and pipelines for liquid chemicals shall be specific to the chemicals and not for alternates.

(iii) Chemicals shall be stored in covered or unopened shipping containers, unless the chemical is transferred into a covered storage unit.

(iv) Liquid chemical storage tanks must:

(A) Have a liquid level indicator, and

(B) Have an overflow and a receiving basin or drain capable of receiving accidental spills or overflows, and meeting all requirements of R309-525-23, and

(C) Be equipped with an inverted "J" air vent.

(v) Acids shall be kept in closed acid-resistant shipping containers or storage units.

(b) Safe Handling.

(i) Material Safety Data Sheets for all chemicals utilized shall be kept and maintained in prominent display and be easily accessed by operators.

(ii) Provisions shall be made for disposing of empty bags, drums or barrels by an acceptable procedure which will minimize operator exposure to dusts.

(iii) Provisions shall be made for measuring quantities of chemicals used to prepare feed solutions.

(c) Dust Control and Ventilation.

Adequate provision shall be made for dust control and ventilation.

(7) Feeder Design, Location and Control.

(a) General Feeder Design.

General equipment design, location and control shall be such that:

(i) feeders shall supply, at all times, the necessary amounts of chemicals at an accurately controlled rate, throughout the anticipated range of feed,

(ii) chemical-contact materials and surfaces are resistant to the aggressiveness of the chemicals,

(iii) corrosive chemicals are introduced in a manner to minimize potential for corrosion,

(iv) chemicals that are incompatible are not fed, stored or handled together.

(v) all chemicals are conducted from the feeder to the point of application in separate conduits,

(vi) spare parts are available for all feeders to replace parts which are subject to wear and damage,

(vii) chemical feeders are as near as practical to the feed point,

(viii) chemical feeders and pumps operate at no lower than 20 percent of the feed range,

(ix) chemicals are fed by gravity where practical,

(x) be readily accessible for servicing, repair, and observation.

(b) Chemical Feed Equipment.

Where chemical feed is necessary for the protection of the consumer, such as disinfection, coagulation or other essential processes:

(i) a minimum of two feeders, one active and one standby, shall be provided for each chemical,

(ii) the standby unit or a combination of units of sufficient capacity shall be available to replace the largest unit during shut-downs,

(iii) where a booster pump is required, duplicate equipment shall be provided and, when necessary, standby power,

(iv) a separate feeder shall be used for each non-compatible chemical applied where a feed pump is required, and

(v) spare parts shall be available for all feeders to replace parts which are subject to wear and damage.

(c) Dry Chemical Feeders.

Dry chemical feeders shall:

(i) measure feed rate of chemicals volumetrically or gravimetrically, and

(ii) provide adequate solution water and agitation of the chemical in the solution tank.

(d) Feed Rate Control.

(i) Feeders may be manually or automatically controlled, with automatic controls being designed to allow override by manual controls.

(ii) Chemical feed rates shall be proportional to flows.

(iii) A means to measure water flow rate shall be provided.

(iv) Provisions shall be made for measuring the quantities of chemicals used.

(v) Weighing scales:

(A) shall be provided for weighing cylinders at all plants using chlorine gas,

(B) may be required for fluoride solution feed, where applicable,

(C) shall be provided for volumetric dry chemical feeders, and

(D) shall be accurate to measure increments of 0.5 percent of scale capacity.

(8) Feeder Appurtenances.

(a) Liquid Chemical Solution Pumps.

Positive displacement type solution feed pumps shall be used to feed liquid chemicals, but shall not be used to feed chemical slurries. Pumps must be sized to match or exceed maximum head conditions found at the point of injection. All liquid chemical feeders shall be provided with devices approved by the Utah Plumbing Code which will prevent the siphoning of liquid chemical through the pump.

(b) Solution Tanks.

(i) A means consistent with the nature of the chemical solution shall be provided in a solution tank to maintain a uniform strength of solution. Continuous agitation shall be provided to maintain slurries in suspension.

(ii) Means shall be provided to measure the solution level in the tank.

(iii) Chemical solutions shall be kept covered. Large tanks with access openings shall have the openings curbed and fitted with tight overhanging covers.

(iv) Subsurface locations are discouraged, but when used for solution tanks shall:

(A) be free from sources of possible contamination, and

(B) assure positive drainage for ground waters, accumulated water, chemical spills and overflows.

(v) Overflow pipes, when provided, shall:

(A) have a free fall discharge, and

(B) be located where noticeable.

(vi) Acid storage tanks shall be vented to the outside atmosphere, but not through vents in common with day tanks.

(vii) Each tank shall be provided with a valved drain, protected against backflow in accordance with R309-525-11(10)(b) and R309-525-11(10)(c).

(viii) Solution tanks shall be located and protective curbing provided so that chemicals from equipment failure, spillage or accidental drainage shall not enter the water in conduits, treatment or storage basins.

(ix) When polymers are used, storage tanks shall be located away from heat sources and direct sunlight.

(c) Day Tanks.

(i) Day tanks shall be provided where dilution of liquid chemical is required prior to feeding.

(ii) Day tanks shall meet all the requirements of R309-525-11(9)(b).

(iii) Certain chemicals, such as polymers, become unstable after hydration, therefore, day tanks shall hold no more than a thirty hour supply unless manufacturer's recommendations allow for longer periods.

(iv) Day tanks shall be scale-mounted, or have a calibrated gauge painted or mounted on the side if liquid levels cannot be observed in a gauge tube or through translucent sidewalls of the tank. In opaque tanks, a gauge rod extending above a referenced point at the top of the tank, attached to a float may be used. The ratio of the cross-sectional area of the tank to its height must be such that unit readings are meaningful in relation to the total amount of chemical fed during a day.

(v) Hand pumps may be provided for transfer from a carboy or drum. A top rack may be used to permit withdrawal into a bucket from a spigot. Where motor-driven transfer pumps are provided a liquid level limit switch and an overflow from the day tank, which will drain by gravity back into the bulk storage tank, must be provided.

(vi) A means which is consistent with the nature of the chemical solution shall be provided to maintain uniform strength of solution in a day tank. continuous agitation shall be provided to maintain chemical slurries in suspension.

(vii) Tanks shall be properly labeled to designate the chemical contained.

(d) Feed Lines.

(i) Feed lines shall be as short as possible in length of run, and be:

(A) of durable, corrosion resistant material,

(B) easily accessible throughout the entire length,

(C) protected against freezing, and

(D) readily cleanable.

(ii) Feed lines shall slope upward from the chemical source to the feeder when conveying gases.

(iii) Lines shall be designed with due consideration of scale forming or solids depositing properties of the water, chemical, solution or mixture conveyed.

(9) Make up Water Supply and Protection.

(a) In Plant Water Supply.

In plant water supply shall be:

(i) Ample in supply, adequate in pressure, and of a quality equal to or better than the water at the point of application.

(ii) Provided with means for measurement when preparing specific solution concentrations by dilution.

(iii) Properly protected against backflow.

(b) Cross-Connection Control.

Cross-connection control shall be provided to assure that:

(i) The make-up waterlines discharging to solution tanks shall be properly protected from backflow as required by the Utah Plumbing Code.

(ii) Liquid chemical solutions cannot be siphoned through solution feeders into the process units as required in R309-525-11(9)(c).

(iii) No direct connection exists between any sewer and the drain or overflow from the feeder, solution chamber or tank by providing that all pipes terminate at least six inches or two pipe diameters, whichever is greater, above the overflow rim of a receiving sump, conduit or waste receptacle.

(iv) Pre- and post-chlorination systems must be independent to prevent possible siphoning of partially treated water into the clear well. The water supply to each eductor shall have a separate shut-off valve. No master shut off valve will be allowed.

(c) Liquid Chemical Feeders, Siphon Control.

Liquid chemical feeders shall be such that chemical solutions cannot be siphoned into the process units, by:

(i) Assuring positive pressure at the point of discharge,

(ii) Providing vacuum relief,

(iii) Providing a suitable air gap, or

(iv) Other suitable means or combinations as necessary.

(10) Operator Safety.

Design of the plant shall be in accordance with the Utah Occupational Safety and Health Act (UOSHA). The designer and public water system management are responsible to see that they incorporate applicable UOSHA standards into the facility design and operation. Review of facility plans by the Division shall be limited to the following recommendations:

(a) Floor surfaces should be smooth and impervious, slip-proof and well drained,

(b) At least one pair of rubber gloves, a dust respirator of a type certified by the National Institute of Occupational Safety and Health (NIOSH) for toxic dusts, an apron or other protective clothing and goggles or face mask should be provided for each operator, A deluge shower and/or eye washing device should be installed where strong acids and alkalis are used or stored.

(c) A water holding tank that will allow water to reach room temperature should be installed in the water line feeding the deluge shower and eye washing device. Other methods of water tempering may be available.

(d) Adequate ventilation should be provided.

(11) Design for Specific Chemicals.

Design of the plant shall be in accordance with the Utah Occupational Safety and Health Act (UOSHA). The designer and

public water system management are responsible to see that they incorporate applicable UOSHA standards into the facility design and operation. Review of facility plans by the Division shall be limited to the following recommendations:

Acids and Caustics.

(i) Acids and caustics should be kept in closed corrosion-resistant shipping containers or storage units.

(ii) Acids and caustics should not be handled in open vessels, but should be pumped in undiluted form from original containers through suitable hose, to the point of treatment or to a covered day tank.

Sodium Chlorite for Chlorine Dioxide Generation.

Proposals for the storage and use of sodium chlorite should be approved by the Executive Secretary prior to the preparation of final plans and specifications. Provisions should be made for proper storage and handling of sodium chlorite to eliminate any danger of explosion.

(i) Sodium Chlorite Storage: (A) Sodium chlorite should be stored by itself in a separate room and preferably should be stored in an outside building detached from the water treatment facility. It should be stored away from organic materials which would react violently with sodium chlorite; (B) The storage structures should be constructed of noncombustible materials; (C) If the storage structure is to be located in a area where a fire may occur, water should be available to keep the sodium chlorite area sufficiently cool to prevent decomposition from heat and resultant potential explosive conditions.

(ii) Sodium Chlorite Handling: (A) Care should be taken to prevent spillage; (B) An emergency plan of operation should be available for the clean up of any spillage; (C) Storage drums should be thoroughly flushed prior to recycling or disposal.

(iii) Sodium Chlorite Feeders: (A) Positive displacement feeders should be provided; (B) Tubing for conveying sodium chlorite or chlorine dioxide solutions should be Type 1 PVC, polyethylene or materials recommended by the manufacturer; (C) Feed lines should be installed in a manner to prevent formation of gas pockets and should terminate at a point of positive pressure; (D) Check valves should be provided to prevent the backflow of chlorine into the sodium chlorite line.

R309-525-12. Mixing.

(1) Flash Mix.

(a) Equipment - Mechanical, in-line or jet mixing devices shall be used.

(b) Mixing - All devices used in rapid mixing shall be capable of imparting a minimum velocity gradient (G) of at least 750 fps per foot. Mixing time shall be less than thirty seconds.

(c) Location - The flash mix and flocculation basins shall be as close together as possible.

(d) Introduction of chemicals - Primary coagulant chemicals shall be added at the point of maximum turbulence within the flash mix unit. Where in-line mixing devices are used chemical injection should be at the most appropriate upstream point.

(2) Flocculation.

(a) Basin design.

Inlet and outlet design shall prevent short-circuiting and destruction of floc. A drain or pumps shall be provided to handle dewatering and sludge removal.

(b) Detention.

The flow-through velocity shall not be less than 0.5 feet per minute nor greater than 1.5 feet per minute with a detention time for floc formation of at least 30 minutes.

(c) Equipment.

Agitators shall be driven by variable speed drives with the peripheral speed of paddles ranging from 0.5 fps to 2.0 fps. Equipment shall be capable of imparting a velocity gradient (G) between 25 fps per foot and 80 fps per foot to the water treated. Compartmentalized tapered energy flocculation concept may also be used in which G tapers from 100 fps to 10 fps per foot.

(d) Hydraulic flocculation.

Hydraulic flocculation may be permitted and shall be reviewed on a case by case basis. The unit must yield a G value equivalent to that required by b and c above.

(e) Piping.

Flocculation and sedimentation basins shall be as close as possible. The velocity of flocculated water through pipes or conduits to settling basins shall not be less than 0.5 fps nor greater than 1.5 fps. Allowance must be made to minimize turbulence at bends and changes in direction.

(f) Other designs.

Baffling may be used to provide for flocculation in small plants only after consultation with the Division. The design shall be such that the velocities and flows noted above will be maintained.

(g) Visible floc.

The flocculation unit shall be capable of producing a visible, settleable floc.

R309-525-13. Sedimentation.

(1) General Design Requirements.

Sedimentation shall follow flocculation. The detention time for effective clarification is dependent upon a number of factors related to basin design and the nature of the raw water. The following criteria apply to conventional sedimentation units:

(a) Inlet devices.

Inlets shall be designed to distribute the water equally and at uniform velocities. Open ports, submerged ports, or similar entrance arrangements are required. A baffle shall be constructed across the basin close to the inlet end and shall project several feet below the water surface to dissipate inlet velocities and provide uniform flows across the basin.

(b) Outlet devices.

Outlet devices shall be designed to maintain velocities suitable for settling in the basin and to minimize short-circuiting. The use of submerged orifices is recommended in order to provide a volume above the orifices for storage when there are fluctuations in the flow.

(c) Emergency Overflow.

An overflow weir (or pipe) shall be installed which will establish the maximum water level desired on top of the filters. It shall discharge by gravity with a free fall to a location where the discharge will be visible.

(d) Sludge Removal.

Sludge removal design shall provide that:

(i) sludge pipes shall be not less than three inches in diameter and arranged to facilitate cleaning,

(ii) entrance to sludge withdrawal piping shall prevent clogging,

(iii) valves shall be located outside the basin for accessibility, and

(iv) the operator may observe and sample sludge being withdrawn from the unit.

(v) Sludge collection shall be accomplished by mechanical means.

(e) Drainage.

Basins shall be provided with a means for dewatering. Basin bottoms shall slope toward the drain not less than one foot in 12 feet where mechanical sludge collection equipment is not provided.

(f) Flushing lines.

Flushing lines or hydrants shall be provided and shall be equipped with backflow prevention devices acceptable to the Executive Secretary.

(g) Safety.

Appropriate safety devices shall be included as required by the Occupational Safety and Health Act (OSHA).

(h) Removal of floating material.

Provision shall be made for the periodic removal of floating material.

(2) Sedimentation Without Tube Settlers.

If tube settling equipment is not used within settling basins, the following requirements apply:

(a) Detention Time.

A minimum of four hours of detention time shall be provided. Reduced sedimentation time may be approved when equivalent effective settling is demonstrated or multimedia filtration is employed.

(b) Weir Loading.

The rate of flow over the outlet weir shall not exceed 20,000 gallons per day per foot of weir length. Where submerged orifices are used as an alternate for overflow weirs they shall not be lower than three feet below the water surface when the flow rates are equivalent to weir loading.

(c) Velocity.

The velocity through settling basins shall not exceed 0.5 feet per minute. The basins shall be designed to minimize short-circuiting. Fixed or adjustable baffles shall be provided as necessary to achieve the maximum potential for clarification.

(d) Depth.

The depth of the sedimentation basin shall be designed for optimum removal.

(3) Sedimentation With Tube Settlers.

Proposals for settler unit clarification shall be approved by

the Executive Secretary prior to the preparation of final plans and specifications.

(a) Inlet and outlet design shall be such to maintain velocities suitable for settling in the basin and to minimize short circuiting.

(b) Flushing lines shall be provided to facilitate maintenance and be properly protected against backflow or back siphonage. Drain and sludge piping from the settler units shall be sized to facilitate a quick flush of the settler units and to prevent flooding other portions of the plant.

(c) Although most units will be located within a plant, design of outdoor installations shall provide sufficient freeboard above the top of settlers to prevent freezing in the units.

(d) The design application rate shall be a maximum rate of 2 gal/sq.ft./min of cross-sectional area (based on 24-inch long 60 degree tubes or 39.5-inch long 7.5 degree tubes), unless higher rates are successfully shown through pilot plant or in-plant demonstration studies.

R309-525-14. Solids Contact Units.

(1) General.

Solids contact units are generally acceptable for combined softening and clarification where water characteristics, especially temperature, do not fluctuate rapidly, flow rates are uniform and operation is continuous. Before such units are considered as clarifiers without softening, specific approval of the Executive Secretary shall be obtained. A minimum of two units are required for surface water treatment.

(2) Installation of Equipment

The design engineer shall see that a representative of the manufacturer is present at the time of initial start-up operation to assure that the units are operating properly.

(3) Operation of Equipment.

The following shall be provided for plant operation:

(a) a complete outfit of tools and accessories,

(b) necessary laboratory equipment, and

(c) adequate piping with suitable sampling taps so located as to permit the collection of samples of water from critical portions of the units.

(4) Chemical feed.

Chemicals shall be applied at such points and by such means as to insure satisfactory mixing of the chemicals with the water.

(5) Mixing.

A flash mix device or chamber ahead of solids contact units may be required to assure proper mixing of the chemicals applied. Mixing devices employed shall be so constructed as to:

(a) provide good mixing of the raw water with previously formed sludge particles, and

(b) prevent deposition of solids in the mixing zone.

(6) Flocculation.

Flocculation equipment:

(a) shall be adjustable (speed and/or pitch),

(b) shall provide for coagulation in a separate chamber or baffled zone within the unit, and

(c) shall provide the flocculation and mixing period to be not less than 30 minutes.

(7) Sludge concentrators.

(a) The equipment shall provide either internal or external concentrators in order to obtain a concentrated sludge with a minimum of waste water.

(b) Large basins shall have at least two sumps for collecting sludge with one sump located in the central flocculation zone.

(8) Sludge removal.

Sludge removal design shall provide that:

(a) sludge pipes shall be not less than three inches in diameter and so arranged as to facilitate cleaning,

(b) the entrance to the sludge withdrawal piping shall prevent clogging,

(c) valves shall be located outside the tank for accessibility, and

(d) the operator may observe and sample sludge being withdrawn from the unit.

(9) Cross-connections.

(a) Blow-off outlets and drains shall terminate and discharge at places satisfactory to the Executive Secretary.

(b) Cross-connection control must be included for the finished drinking water lines used to back flush the sludge lines.

(10) Detention period.

The detention time shall be established on the basis of the raw water characteristics and other local conditions that affect the operation of the unit. Based on design flow rates, the detention time shall be:

(a) two to four hours for suspended solids contact clarifiers and softeners treating surface water, and

(b) one to two hours for suspended solids contact softeners treating only ground water.

(11) Suspended slurry concentrate.

Softening units shall be designed so that continuous slurry concentrates of one percent or more, by weight, can be satisfactorily maintained.

(12) Water losses.

(a) Units shall be provided with suitable controls for sludge withdrawal.

(b) Total water losses shall not exceed:

(i) five percent for clarifiers,

(ii) three percent for softening units.

(c) Solids concentration of sludge bled to waste shall be:

(i) three percent by weight for clarifiers,

(ii) five percent by weight for softeners.

(13) Weirs or orifices.

The units shall be equipped with either overflow weirs or orifices constructed so that water at the surface of the unit does not travel over 10 feet horizontally to the collection trough.

(a) Weirs shall be adjustable, and at least equivalent in length to the perimeter of the basin.

(b) Weir loading shall not exceed:

(i) 10 gpm per foot of weir length for units used for

clarifiers

(ii) 20 gpm per foot of weir length for units used for softeners.

(c) Where orifices are used the loading rates per foot of launderer shall be equivalent to weir loadings. Either shall produce uniform rising rates over the entire area of the tank.

(14) Upflow rates.

Upflow rates shall not exceed:

(a) 1.0 gpm/sf at the sludge separation line for units used for clarifiers,

(b) 1.75 gpm/sf at the slurry separation line for units used as softeners.

R309-525-15. Filtration.

(1) General.

Filters may be composed of one or more media layers. Mono-media filters are relatively uniform throughout their depth. Dual or multi-layer beds of filter material are so designed that water being filtered first encounters coarse material, and progressively finer material as it travels through the bed.

(2) Rate of Filtration.

(a) The rate of filtration shall be determined through consideration of such factors as raw water quality, degree of pretreatment provided, filter media, water quality control parameters, competency of operating personnel, and other factors as determined by the Executive Secretary. Generally, higher filter rates can be assigned for the dual or multi-media filter than for a single media filter because the former is more resistant to filter breakthrough.

(b) The filter rate shall be proposed and justified by the designing engineer to the satisfaction of the Executive Secretary prior to the preparation of final plans and specifications.

(c) The use of dual or multi-media filters may allow a reduction of sedimentation detention time (see R309-525-13(2)(a)) due to their increased ability to store sludge.

(d) Filter rates assigned by the Executive Secretary must never be exceeded, even during backwash periods.

(e) The use of filter types other than conventional rapid sand gravity filters must receive written approval from the Executive Secretary prior to the preparation of final plans and specifications.

(3) Number of Filters Required.

At least two filter units shall be provided. Where only two filter units are provided, each shall be capable of meeting the plant design capacity (normally the projected peak day demand) at the approved filtration rate. Where more than two filter units are provided, filters shall be capable of meeting the plant design capacity at the approved filtration rate with one filter removed from service. Refer to R309-525-5 for situations where these requirements may be relaxed.

(4) Media Design.

R309-525-15(4)(a) through R309-525-15(4)(e), which follow, give requirements for filter media design. These requirements are considered minimum and may be made more stringent if deemed

appropriate by the Executive Secretary.

(a) Mono-media, Rapid Rate Gravity Filters.

The allowable maximum filtration rate for a silica sand, mono-media filter is three gpm/sf This type of filter is composed of clean silica sand having an effective size of 0.35 mm to 0.65 mm and having a uniformity coefficient less than 1.7. The total bed thickness must not be less than 24 inches nor generally more than 30 inches.

(b) Dual Media, Rapid Rate Gravity Filters.

The following applies to all dual media filters:

(i) Total depth of filter bed shall not be less than 24 inches nor generally more than 30 inches.

(ii) All materials used to make up the filter bed shall be of such particle size and density that they will be effectively washed at backwash rates between 15 and 20 gpm/sf They must settle to reconstitute the bed essentially in the original layers upon completion of backwashing.

(iii) The bottom layer must be at least ten inches thick and consist of a material having an effective size no greater than 0.45 mm and a uniformity coefficient not greater than 1.5.

(iv) The top layer shall consist of clean crushed anthracite coal having an effective size of 0.45 mm to 1.2 mm, and a uniformity coefficient not greater than 1.5.

(v) Dual media filters will be assigned a filter rate up to six gpm/sf. Generally if the bottom fine layer consists of a material having an effective size of 0.35 mm or less, a filtration rate of six gpm/sf can be assigned.

(vi) Each dual media filter must be provided with equipment which shall continuously monitor turbidity in the filtered water. The equipment shall be so designed to initiate automatic backwash if the filter effluent turbidity exceeds 0.3 NTU. If the filter turbidity exceeds one NTU, filter shutdown is required. In plants attended part-time, this shutdown must be accomplished automatically and shall be accompanied by an alarm. In plants having full-time operators, a one NTU condition need only activate an alarm. Filter shutdown may then be accomplished by the operator.

(c) Tri-Media, Rapid Rate Gravity Filters.

The following applies to all Tri-media filters:

(i) Total depth of filter bed shall not be less than 24 inches nor generally more than 30 inches.

(ii) All materials used to make up the filter bed shall be of such particle size and density that they will be effectively washed at backwash rates between 15 and 20 gpm/sf. They must settle to reconstitute the bed to the normal gradation of coarse to fine in the direction of flow upon completion of backwashing.

(iii) The bottom layer must be at least four inches thick and consist of a material having an effective size no greater than 0.45 mm and uniformity coefficient not greater than 2.2. The bottom layer thickness may be reduced to three inches if it consists of a material having an effective size no greater than 0.25 mm and a uniformity coefficient not greater than 2.2.

(iv) The middle layer must consist of silica sand having an effective size of 0.35 mm to 0.8 mm, and a uniformity coefficient

not greater than 1.8.

(v) The top layer shall consist of clean crushed anthracite coal having an effective size of 0.45 mm to 1.2 mm, and a uniformity coefficient not greater than 1.85.

(vi) Tri-media filters will be assigned a filter rate up to 6 gpm/sf. Generally, if the bottom fine layer consists of a material having an effective size of 0.35 mm or less, a filtration rate of six gpm/sf can be assigned.

(vii) Each Tri-media filter must be provided with equipment which shall continuously monitor turbidity in the filtered water. The equipment shall be so designed to initiate automatic backwash if the effluent turbidity exceeds 0.3 NTU. If the filter turbidity exceeds one NTU, filter shutdown is required. In plants attended part-time, this shutdown must be accomplished automatically and shall be accompanied by an alarm. In plants having full-time operators, a one NTU condition need only activate an alarm. Filter shutdown may then be accomplished by the operator.

(d) Granulated Activated Carbon (GAC).

Use of granular activated carbon media shall receive the prior approval of the Executive Secretary, and must meet the basic specifications for filter material as given above, and:

(i) There shall be provision for adding a disinfectant to achieve a suitable residual in the water following the filters and prior to distribution,

(ii) There shall be a means for periodic treatment of filter material for control of biological or other growths,

(iii) Facilities for carbon regeneration or replacement must be provided.

(e) Other Media Compositions and Configurations.

Filters consisting of materials or configurations not prescribed in this section will be considered on experimental data or available operation experience.

(5) Support Media, Filter Bottoms and Strainer Systems.

Care must be taken to insure that filter media, support media, filter bottoms and strainer systems are compatible and will give satisfactory service at all times.

(a) Support Media.

The design of support media will vary with the configuration of the filtering media and the filter bottom. Thus, support media and/or proprietary filter bottoms shall be reviewed on a case-by-case basis.

(b) Filter Bottoms and Strainer Systems.

(i) The design of manifold type collection systems shall:

(A) Minimize loss of head in the manifold and laterals,

(B) Assure even distribution of washwater and even rate of filtration over the entire area of the filter,

(C) Provide a ratio of the area of the final openings of the strainer system to the area of the filter of about 0.003,

(D) Provide the total cross-sectional area of the laterals at about twice the total area of the final openings,

(E) Provide the cross-sectional area of the manifold at 1.5 to 2 times the total area of the laterals.

(ii) Departures from these standards may be acceptable for

high rate filter and for proprietary bottoms.

(iii) Porous plate bottoms shall not be used where calcium carbonate, iron or manganese may clog them or with waters softened by lime.

(6) Structural Details and Hydraulics.

The filter structure shall be so designed as to provide for:

(a) Vertical walls within the filter,

(b) No protrusion of the filter walls into the filter media,

(c) Cover by superstructure,

(d) Head room to permit normal inspection and operation,

(e) Minimum water depth over the surface of the filter media of three feet, unless an exception is granted by the Executive Secretary,

(f) Maximum water depth above the filter media shall not exceed 12 feet,

(g) Trapped effluent to prevent backflow of air to the bottom of the filters,

(h) Prevention of floor drainage to enter onto the filter by installation of a minimum four inch curb around the filters,

(i) Prevention of flooding by providing an overflow or other means of control,

(j) Maximum velocity of treated water in pipe and conduits to filters of two fps,

(k) Cleanouts and straight alignment for influent pipes or conduits where solids loading is heavy or following lime-soda softening,

(l) Washwater drain capacity to carry maximum flow,

(m) Walkways around filters, to be not less than 24 inches wide,

(n) Safety handrails or walls around filter areas adjacent to normal walkways,

(o) No common wall between filtered and unfiltered water shall exist. This requirement may be waived by the Executive Secretary for small "package" type plants using metal tanks of sufficient thickness,

(p) Filtration to waste for each filter.

(7) Backwash.

(a) Water Backwash Without Air.

Water backwash systems shall be designed so that backwash water is not recycled to the head of the treatment plant unless it has been settled, as a minimum. Furthermore, water backwash systems; including tanks, pumps and pipelines, shall:

(i) Provide a minimum backwash rate of 15 gpm/sf, consistent with water temperatures and the specific gravity of the filter media. The design shall provide for adequate backwash with minimum media loss. A reduced rate of 10 gpm/sf may be acceptable for full depth anthracite or granular activated carbon filters.

(ii) provide finished drinking water at the required rate by washwater tanks, a washwater pump, from the high service main, or a combination of these.

(iii) Permit the backwashing of any one filter for not less than 15 minutes.

(iv) Be capable of backwashing at least two filters, consecutively.

(v) Include a means of varying filter backwash rate and time.

(vi) Include a washwater regulator or valve on the main washwater line to obtain the desired rate of filter wash with washwater valves or the individual filters open wide.

(vii) Include a rate of flow indicator, preferably with a totalizer on the main washwater line, located so that it can be easily read by the operator during the washing process.

(viii) Be designed to prevent rapid changes in backwash water flow.

(ix) Use only finished drinking water.

(x) Have washwater pumps in duplicate unless an alternate means of obtaining washwater is available.

(xi) Perform in conjunction with "filter to waste" system to allow filter to stabilize before introduction into clearwell.

(b) Backwash with Air Scouring.

Air scouring can be considered in place of surface wash when:

(i) air flow for air scouring the filter must be 3 to 5 scfm/sf of filter area when the air is introduced in the underdrain; a lower air rate must be used when the air scour distribution system is placed above the underdrains,

(ii) a method for avoiding excessive loss of the filter media during backwashing must be provided,

(iii) air scouring must be followed by a fluidization wash sufficient to restratify the media,

(iv) air must be free from contamination,

(v) air scour distribution systems shall be placed below the media and supporting bed interface; if placed at the interface the air scour nozzles shall be designed to prevent media from clogging the nozzles or entering the air distribution system.

(vi) piping for the air distribution system shall not be flexible hose which will collapse when not under air pressure and shall not be a relatively soft material which may erode at the orifice opening with the passage of air at high velocity.

(vii) air delivery piping shall not pass down through the filter media nor shall there be any arrangement in the filter design which would allow short circuiting between the applied unfiltered water and the filtered water,

(viii) consideration shall be given to maintenance and replacement of air delivery piping,

(ix) when air scour is provided the backwash water rate shall be variable and shall not exceed eight gpm/sf unless operating experience shows that a higher rate is necessary to remove scoured particles from filter surfaces.

(x) the filter underdrains shall be designed to accommodate air scour piping when the piping is installed in the underdrain, and

(xi) the provisions of Section R309-525-15(7)(a) (Backwash) shall be followed.

(8) Surface Wash or Subsurface Wash.

Surface wash or subsurface wash facilities are required except for filters used exclusively for iron or manganese removal. Washing may be accomplished by a system of fixed nozzles or a revolving-type apparatus, provided:

(a) Provisions for water pressures of at least 45 psi,

(b) A properly installed vacuum breaker or other approved device to prevent back-siphonage if connected to a finished drinking water system,

(c) All washwater must be finished drinking water,

(d) Rate of flow of two gpm/sf of filter area with fixed nozzles or 0.5 gpm/sf with revolving arms.

(9) Washwater Troughs.

Washwater troughs shall be so designed to provide:

(a) The bottom elevation above the maximum level of expanded media during washing,

(b) A two inch freeboard at the maximum rate of wash,

(c) The top edge level and all edges of trough at the same elevation

(d) Spacing so that each trough serves the same number of square feet of filter areas,

(e) Maximum horizontal travel of suspended particles to reach the trough not to exceed three feet.

(10) Appurtenances.

(a) The following shall be provided for every filter:

(i) Sample taps or means to obtain samples from influent and effluent,

(ii) A gauge indicating loss of head,

(iii) A meter indicating rate-of-flow. A modified rate controller which limits the rate of filtration to a maximum rate may be used. However, equipment that simply maintains a constant water level on the filters is not acceptable, unless the rate of flow onto the filter is properly controlled,

(iv) A continuous turbidity monitoring device where the filter is to be loaded at a rate greater than three gpm/sf

(v) Provisions for draining the filter to waste with appropriate measures for backflow prevention (see R309-525-23).

(i) Wall sleeves providing access to the filter interior at several locations for sampling or pressure sensing,

(ii) A 1.0 inch to 1.5 inch diameter pressure hose and storage rack at the operating floor for washing filter walls.

(11) Miscellaneous.

Roof drains shall not discharge into filters or basins and conduits preceding the filters.

R309-525-16. In-Plant Finished Drinking Water Storage.

(1) General.

In addition to the following, the applicable design standards of R309-545 shall be followed for plant storage.

(a) Backwash Water Tanks.

Backwash water tanks shall be sized, in conjunction with available pump units and finished water storage, to provide the backwash water required by R309-525-15(7). Consideration shall be given to the backwashing of several filters in rapid succession.

(b) Clearwell.

Clearwell storage shall be sized, in conjunction with distribution system storage, to relieve the filters from having to follow fluctuations in water use.

(i) When finished water storage is used to provide the

contact time for chlorine (see R309-520-10(1)(f), especially sub-section (f)(iv)), special attention must be given to size and baffling.

(ii) To ensure adequate chlorine contact time, sizing of the clearwell shall include extra volume to accommodate depletion of storage during the nighttime for intermittently operated filtration plants with automatic high service pumping from the clearwell during non-treatment hours.

(iii) An overflow and vent shall be provided.

(2) Adjacent Compartments.

Finsihed drinking water shall not be stored or conveyed in a compartment adjacent to unsafe water when the two compartments are separated by a single wall. The Executive Secretary may grant an exception to this requirement for small "package" treatment plants using metal tanks of sufficient wall thickness.

(3) Basins and Wet-Wells.

Receiving basins and pump wet-wells for finished drinking water shall be designed as drinking water storage structures. (See Section R309-545)

R309-525-17. Miscellaneous Plant Facilities.

(1) Laboratory.

Sufficient laboratory equipment shall be provided to assure proper operation and monitoring of the water plant. A list of required laboratory equipment is:

(a) one floc testing apparatus with illuminated base and variable speed stirrer,

(b) 10 each 1000 ml Griffin beakers (plastic is highly recommended over glass to prevent breakage),

(c) one 1000 ml graduated cylinder (plastic is highly recommended over glass to prevent breakage),

(d) pH test strips (6.0 to 8.5),

(e) five wide mouth 25 ml Mohr pipets,

(f) one triple beam, single pan or double pan balance with 0.1 g sensitivity and 2000 g capacity (using attachment weights),

(g) DPD chlorine test kit,

(h) bench-top turbidimeter,

(i) five each 1000 ml reagent bottles with caps,

(j) dish soap,

(k) brush (2 3/4 inch diameter by 5 inch),

(l) one platform scale 1/2 lb sensitivity, 100 lb capacity,

(m) book - Simplified Procedures for Water Examination, AWWA Manual M12

(2) Continuous Turbidity Monitoring and Recording Equipment.

Continuous turbidity monitoring and recording facilities shall be located as specified in R309-215-9.

(3) Sanitary and Other Conveniences.

All treatment plants shall be provided with finished drinking water, lavatory and toilet facilities unless such facilities are otherwise conveniently available. Plumbing must conform to the Utah Plumbing Code and must be so installed to prevent contamination of a public water supply.

R309-525-18. Sample Taps.

Sample taps shall be provided so that water samples can be obtained from appropriate locations in each unit operation of treatment. Taps shall be consistent with sampling needs and shall not be of the petcock type. Taps used for obtaining samples for bacteriological analysis shall be of the smooth-nosed type without interior or exterior threads, shall not be of the mixing type, and shall not have a screen, aerator, or other such appurtenance.

R309-525-19. Operation and Maintenance Manuals.

Operation and maintenance manuals shall be prepared for the treatment plant and found to be acceptable by the Executive Secretary. The manuals shall be usable and easily understood. They shall describe normal operating procedures, maintenance procedures and emergency procedures.

R309-525-20. Operator Instruction.

Provisions shall be made for operator instruction at the start-up of a plant.

R309-525-21. Safety.

All facilities shall be designed and constructed with due regard for safety, comfort and convenience. As a minimum, all applicable requirements of Utah Occupational Safety and Health Act (UOSHA) must be adhered to.

R309-525-22. Disinfection Prior To Use.

All pipes, tanks, and equipment which can convey or store finished drinking water shall be disinfected in accordance with the following AWWA procedures:

(1) C651-05 [~~99~~] Disinfecting Water Mains
(2) C652-02 [~~92~~] Disinfection of Water Storage Facilities
(3) C653-03 [~~97~~] Disinfection of Water Treatment Plants

R309-525-23. Disposal of Treatment Plant Waste.

Provisions must be made for proper disposal of water treatment plant waste such as sanitary, laboratory, sludge, and filter backwash water. All waste discharges and treatment facilities shall meet the requirements of the plumbing code, the Utah Department of Environmental Quality, the Utah Department of Health, and the United States Environmental Protection Agency, including the following:

(1) Rules for Onsite Wastewater Disposal Systems, Utah Administrative Code R317-4.
(2) Rules for Water Quality, Utah Administrative Code R317.
(3) Rules for Solid and Hazardous Waste, Utah Administrative Code R315.

In locating waste disposal facilities, due consideration shall be given to preventing potential contamination of a water supply as well as breach or damage due to environmental factors.

R309-525-24. Other Considerations.

Consideration shall be given to the design requirements of other federal, state, and local regulatory agencies for items such as safety requirements, special designs for the handicapped,

plumbing and electrical codes, construction in the flood plain, etc.

R309-525-25. Operation and Maintenance.

(1) Water system operators must determine that all chemicals added to water intended for human consumption are suitable for drinking water use and comply with ANSI/NSF Standard 60.

(2) No chemicals or other substances may be added to public water supplies unless the chemical addition facilities and chemical type have been reviewed and approved by the Executive Secretary. The Executive Secretary shall be notified prior to the changing of primary coagulant type. The Executive Secretary may require documentation to verify that sufficient testing and analysis have been done. The primary coagulant may not be changed without prior approval from the Executive Secretary.

(3) During the operation of a conventional surface water treatment plant stable flow rates shall be maintained through the filters.

(4) All instrumentation needed to verify that treatment processes are sufficient shall be properly calibrated and maintained. As a minimum, this shall include turbidimeters.

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R309. Environmental Quality, Drinking Water.
R309-530. Facility Design and Operation: Alternative Surface Water Treatment Methods.
R309-530-1. Purpose.

This rule specifies requirements for alternative surface water treatment methods. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-530-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with subsection 63-46a of the same, known as the Administrative Rulemaking Act.

R309-530-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-530-4. General.

(1) Alternative Methods.

In addition to conventional surface water treatment method (i.e. coagulation, sedimentation and filtration as outlined in R309-525), several alternative methods may also be suitable. They are: Direct Filtration; Slow Sand Filtration; Membrane Filtration; and Diatomaceous Earth Filtration.

(2) Incorporation of Other Rules.

For each process described in this section pertinent rules are given. The designer shall also incorporate the relevant rules given in other sections into the plans and specifications for any of these specialized treatment methods. Where applicable, the following topics shall be addressed:

(a) Plant Siting (see R309-525-6).
(b) Pre-design Submittal (see R309-515-5(2)).
(c) Plant Reliability (see R309-525-7).
(d) Color Coding and Pipe Marking (see R309-525-8).
(e) Chemical Addition (see R309-525-11).
(f) Miscellaneous Plant Facilities (see R309-525-17, particularly sub-section R309-525-17(1), Laboratory).
(g) Operation and Maintenance Manuals (see R309-525-19).
(h) Safety (see R309-525-21).
(i) Disposal of Treatment Plant Waste (see R309-525-23).
(j) Disinfection (see R309-520).

R309-530-5. Direct Filtration.

(1) Chemical Addition and Mixing.

Direct Filtration is conventional surface water treatment without the sedimentation process. Rules for Chemical Addition

and Mixing shall be the same as found in sections R309-525-11 and R309-525-12.

(2) Source Water Quality.

Direct Filtration applies the destabilized colloids to the filter rather than removing the majority of the load through sedimentation. While this process represents considerable construction cost savings, the source water must have low average turbidity in order to provide reliable service without excessive backwash requirements. Source water with low average turbidity is generally only obtained from large capacity reservoirs.

(3) Design Requirements.

The following requirements shall apply to Direct Filtration plants:

(a) At least one year's record of source water turbidity, sampled at least once per week, shall be presented to the Executive Secretary. A Direct Filtration facility will only be permitted if the data shows that 75% of the measurements are below five (5) NTU. The Executive Secretary shall judge whether Direct Filtration is suitable given the quality of the proposed source water (see R309-515-5(2)(a)(ii)).

(b) Pilot plant studies, acceptable to the Executive Secretary, shall be conducted prior to the preparation of final engineering plans.

(c) Requirements for flash mix and flocculation basin design are given in sub-sections R309-525-12(1) and R309-525-12(2).

(d) Chemical addition and mixing equipment shall be designed to be capable of providing a visible, but not necessarily settleable, floc.

(e) Surface wash, subsurface wash, or air scour shall be provided for the filters in accordance with sub-section R309-525-15(7).

(f) A continuous monitoring turbidimeter shall be installed on each filter effluent line and shall be of a type with at least two alarm conditions capable of meeting the requirements of subsections R309-525-15(4)(b)(vi) or R309-525-15(4)(c)(vii). The combined plant effluent shall be equipped with a continuous turbidimeter having a chart recorder. Additional monitoring equipment to assist in control of the coagulant dose may be required (i.e. streaming current gauges, particle counters, etc.) if the plant cannot consistently meet the requirements of rule R309-103.

(g) In addition to the alarm conditions required above, the plant shall be designed and operated so that the plant will automatically shut down when a source water turbidity of 20 NTU lasts longer than three hours, or when the source water turbidity exceeds 30 NTU at any time.

(h) The plant design and land ownership surrounding the plant shall allow for the installation of conventional sedimentation basins. Sedimentation basins may be required if the Executive Secretary determines the plant is failing to meet minimum water quality or performance standards.

R309-530-6. Slow Sand Filtration.

(1) Acceptability.

Slow sand filtration means a process involving passage of raw water through a bed of sand at low velocity resulting in substantial particle removal by physical and biological mechanisms. The acceptability of slow sand filters as a substitute for "conventional surface water treatment" facilities (detailed in R309-525) shall be determined by the Executive Secretary based on suitability of the source water and demand characteristics of the system.

(2) Source Water Quality.

The Executive Secretary may impose design requirements in addition to those listed herein, in allowing this process. The following shall be considered, among other factors, in determining whether slow sand filtration will be acceptable:

(a) Source water turbidity must be low and consistent. Slow Sand Filtration shall be utilized only when the source waters have turbidity less than 50 NTU and color less than 30 units (see R309-515-5(2)(a)).

(b) The nature of the turbidity particles shall be considered. Turbidity must not be attributable to colloidal clay.

(c) The nature and extent of algae growths in the raw water shall be considered. Algae must not be a species considered as filter and screen-clogging algae as indicated in "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by American Public Health Association, American Water Works Association, and Water Environment Federation. High concentrations of algae in the raw water can cause short filter runs; the amount of algae, expressed as the concentration of chlorophyll *a* [~~a~~] in the raw water shall not exceed 0.005 mg/l.

(3) Pilot Plant Studies.

The Executive Secretary shall allow the use of Slow Sand Filtration only when the supplier's engineering studies show that the slow sand facility can consistently produce an effluent meeting the quality requirements of rule R309-200 [~~103~~]. The Executive Secretary should be consulted prior to the detailed design of a slow sand facility.

(4) Operation.

Effluent from a Slow Sand Filtration facility shall not be introduced into a public water supply until an active biological mat has been created on the filter.

(5) Design requirements.

The following design parameters shall apply to each Slow Sand Filtration plant:

(a) At least three filter units shall be provided. Where only three units are provided, any two shall be capable of meeting the plant's design capacity (normally the projected "peak daily flow") at the approved filtration rate. Where more than three filter units are provided, the filters shall be capable of meeting the plant design capacity at the approved filtration rate with any one filter removed from service.

(b) All filters shall be protected to prevent freezing. If covered by a structure, enough headroom shall exist to permit normal movement by operating personnel for scraping and sand removal operations. There shall be adequate manholes and access ports for the handling of sand. An overflow at the maximum filter

water level shall be provided.

(c) The permissible rates of filtration shall be determined by the quality of the source water and shall be determined by experimental data derived during pilot studies conducted on the source water. Filtration rates of 0.03 gpm/sf to 0.01 gpm/sf shall be acceptable (equivalent to two to six million gallons per day per acre). Somewhat higher rates may be acceptable when demonstrated to the satisfaction of the Executive Secretary.

(d) Each filter unit shall be equipped with a main drain and an adequate number of lateral underdrains to collect the filtered water. The underdrains shall be so spaced that the maximum velocity of the water flow in the underdrain will not exceed 0.75 fps. The maximum spacing of the laterals shall not exceed three feet if pipe laterals are used.

(e) Filter sand shall be placed on graded gravel layers for an initial filter sand depth of 30 inches. A minimum of 24 inches of filter sand shall be present, even after scraping. The effective size of the filter sand shall be between 0.30 mm and 0.45 mm in diameter. The filter sand uniformity coefficient shall not exceed 2.5. Further, the sand shall throughly washed and found to be clean and free from foreign matter.

(f) A three-inch layer of well rounded sand shall be used as a supporting media for filter sand. It shall have an effective size of 0.8 mm to 2.0 mm in diameter and the uniformity coefficient shall not be greater than 1.7.

(g) A supporting gravel media shall be provided. It shall consist of hard, durable, rounded silica particles and shall not include flat or elongated particles. The coarsest gravel shall be 2.5 inches in size when the gravel rests directly on the strainer system, and must extend above the top of the perforated laterals. Not less than four layers of gravel shall be provided in accordance with the following size and depth distribution when used with perforated laterals:

TABLE 530-1

Size	Depth
2 1/2 to 1 1/2 inches	5 to 8 inches
1 1/2 to 3/4 inches	3 to 5 inches
3/4 to 1/2 inches	3 to 5 inches
1/2 to 3/16 inches	2 to 3 inches
3/16 to 3/32 inches	2 to 3 inches

Reduction of gravel depths may be considered upon justification to the Executive Secretary when proprietary filter bottoms are specified.

(h) Slow sand filters shall be designed to provide a depth of at least three to five feet of water over the sand.

(i) Each filter shall be equipped with: a loss of head gauge; an orifice, venturi meter, or other suitable metering device installed on each filter to control the rate of filtration; and an effluent pipe designed to maintain the water level above the top of the filter sand.

(j) Disinfection of the effluent of Slow Sand Filtration

plants will be required.

(k) A filter-to-waste provision shall be included.

(l) Electrical power shall be available at the plant site.

R309-530-7. Diatomaceous Earth Filtration.

The use of Diatomaceous Earth Filtration units may be considered for application to surface waters with low turbidity and low bacterial contamination, and additionally may be used for iron removal for groundwaters of low quality, providing the removal is effective and the water is of sanitary quality before treatment.

The acceptability of Diatomaceous Earth Filtration as a substitute for "conventional surface water treatment" facilities (detailed in rule R309-525) shall be determined by the Executive Secretary. Determination may be based on the level of support previously exhibited by the public water system management along with a finding by the Executive Secretary that "conventional surface water treatment" or other methods herein described are too costly or unacceptable.

Diatomaceous Earth Filtration consists of a process to remove particles from water wherein a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the source water to maintain the permeability of the filter cake. Diatomite filters are characterized by rigorous operating requirements, high operating costs, and increased sludge production.

Part 4, Section 4.2.3, Diatomaceous Earth Filtration, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and shall govern the design and operation of diatomaceous earth filtration facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-530-8. Membrane Technology.

(1) Acceptability.

Surface waters, or groundwater under the direct influence of surface water (UDI), may be treated using membrane technology (microfiltration, ultrafiltration, nanofiltration) coupled with "primary and secondary disinfection."

(2) Pilot Plant Study.

Because this is a relatively new technology, appropriate investigation shall be conducted by the public water system to assure that the process will produce the required quality of water at a cost which can be borne by the public water system consumers. A pilot plant study shall be conducted prior to the commencement of design. The study must be conducted in accordance with EPA's Environmental Technology Verification Program (ETV) or the protocol and treated water parameters must be approved prior to conducting any testing by the Executive Secretary.

(3) Design Requirements.

The following items shall be addressed in the design of any membrane technology plant intended to provide microbiological treatment of surface waters or groundwater "UDI:"

(a) The facility shall be equipped with an on-line particle counter on the final effluent.

(b) The facility shall be equipped with an automatic membrane integrity test system.

(4) The Executive Secretary shall establish the turbidity limit for 95% of turbidity measurements and the maximum turbidity limit which shall not be exceeded. The plant effluent shall meet the requirements of R309-200-5(5)(a)(ii).

R309-530-9. New Treatment Processes or Equipment.

The policy of the Board is to encourage, rather than to obstruct, the development of new methods and equipment for the treatment of water. Nevertheless, any new processes or equipment must have been thoroughly tested in full-scale, comparable installations, before approval of plans can be issued. Refer to EPA's Environmental Technology Verification Program (ETV).

No new treatment process will be approved for use in Utah unless the designer or supplier can present evidence satisfactory to the Executive Secretary that the process will insure the delivery of water of safe, sanitary quality, without imposing undue problems of supervision, operation and/or control.

The Executive Secretary shall establish the turbidity limit for 95% of turbidity measurements and the maximum turbidity limit which shall not be exceeded. The plant effluent shall meet the requirements of R309-200-5(5)(a)(ii).

KEY: drinking water, direct filtration, slow sand filtration, membrane technology
Date of Enactment or Last Substantive Amendment: December 9, 2002
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-535. Facility Design and Operation: Miscellaneous Treatment Methods.
R309-535-1. Purpose.

The purpose of this rule is to provide specific requirements for miscellaneous water treatment methods which are primarily intended to remove chemical contaminants from drinking water; or, adjust the chemical composition of drinking water. It is intended to be applied in conjunction with other rules, specifically R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-535-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-535-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-535-4. General.

For each process described in this section pertinent rules are given. The designer must also, however, incorporate the relevant rules given in other sections into the plans and specifications for any of these specialized treatment methods. Where applicable, the following topics must be addressed:

(1) Plant Siting (see R309-525-6).
(2) Plant Reliability (see R309-525-7).
(3) Color Coding and Pipe Marking (see R309-525-8).
(4) Chemical Addition (see R309-525-11).
(5) Miscellaneous Plant Facilities (see R309-525-17, particularly sub-section R309-525-17(1), Laboratory).
(6) Operation and Maintenance Manuals (see R309-525-19).
(7) Safety (see R309-525-21).
(8) Disposal of Treatment Plant Waste (see R309-525-23).
(9) Disinfection (see R309-520).

R309-535-5. Fluoridation.

Sodium fluoride, sodium silicofluoride and fluorosilicic acid shall conform to the applicable AWWA standards and/or ANSI/NSF Standard 60. Other fluoride compounds which may be available must be approved by the Executive Secretary.

(1) Fluoride compound storage.

Fluoride chemicals should be isolated from other chemicals to prevent contamination. Compounds shall be stored in covered or unopened shipping containers and should be stored inside a

building. Unsealed storage units for fluorosilicic acid should be vented to the atmosphere at a point outside any building. Bags, fiber drums and steel drums should be stored on pallets.

(2) Chemical feed equipment and methods.

In addition to the requirements in R309-525-11 "Chemical Addition", fluoride feed equipment shall meet the following requirements:

(a) scales, loss-of-weight recorders or liquid level indicators, as appropriate, accurate to within five percent of the average daily change in reading shall be provided for chemical feeds,

(b) feeders shall be accurate to within five percent of any desired feed rate,

(c) fluoride compound shall not be added before lime-soda softening or ion exchange softening,

(d) the point of application of fluorosilicic acid, if into a horizontal pipe, shall be in the lower half of the pipe,

(e) a fluoride solution shall be applied by a positive displacement pump having a stroke rate not less than 20 strokes per minute,

(f) a spring opposed diaphragm type anti-siphon device shall be provided for all fluoride feed lines and dilution water lines,

(g) a device to measure the flow of water to be treated is required,

(h) the dilution water pipe shall terminate at least two pipe diameters above the solution tank,

(i) water used for sodium fluoride dissolution shall be softened if hardness exceeds 75 mg/l as calcium carbonate,

(j) fluoride solutions shall be injected at a point of continuous positive pressure or a suitable air gap provided,

(k) the electrical outlet used for the fluoride feed pump should have a nonstandard receptacle and shall be interconnected with the well or service pump,

(l) saturators should be of the upflow type and be provided with a meter and backflow protection on the makeup water line.

(m) lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.

(3) Secondary controls.

Secondary control systems for fluoride chemical feed devices shall be provided as a means of reducing the possibility for overfeed; these may include flow or pressure switches or other devices.

(4) Protective equipment.

Personal protective equipment as outlined in R309-525-11(10) shall be provided for operators handling fluoride compounds. Deluge showers and eye wash devices shall be provided at all fluorosilicic acid installations.

(5) Dust control.

(a) Provision must be made for the transfer of dry fluoride compounds from shipping containers to storage bins or hoppers in such a way as to minimize the quantity of fluoride dust which may enter the room in which the equipment is installed. The enclosure shall be provided with an exhaust fan and dust filter which place

the hopper under a negative pressure. Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(b) Provision shall be made for disposing of empty bags, drums or barrels in a manner which will minimize exposure to fluoride dusts. A floor drain should be provided to facilitate the hosing of floors.

(6) Testing equipment.

Equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the Executive Secretary.

R309-535-6. Taste and Odor Control.

Part 4, Section 4.9, Taste and Odor Control, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and shall govern the design and operation of taste and odor control facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-7. Stabilization.

Part 4, Section 4.8, Stabilization, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and it shall govern the design and operation of stabilization facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-8. Deionization.

Current practical methods of deionization include Ion Exchange, Reverse Osmosis and Electrodialysis. Additional methods of deionization may be approved subject to the presentation of evidence of satisfactory reliability.

All properly developed groundwater sources having water quality exceeding 2,000 mg/l Total Dissolved Solids and/or 500 mg/l Sulfate shall be either properly diluted or treated by the methods outlined in this section. Deionization cannot be considered a substitute process for conventional complete treatment outlined in R309-525.

(1) Ion Exchange.

(a) General.

Great care shall be taken by the designer to avoid loading the media with water high in organics.

(b) Design.

(i) Pretreatment shall be provided per the manufacturer's recommendation.

(ii) Upflow or down flow units are acceptable.

(iii) Exchangers shall have at least a three foot media depth.

(iv) Exchangers shall be designed to meet the

recommendations of the media manufacturer with regard to flow rate or contact time. In any case, flow shall not exceed seven gpm/sf of bed area. The plant shall be provided with an influent or effluent meter as well as a meter on any bypass line.

(v) Chemical feeders used shall conform with R309-525-8. All solution tanks shall be covered.

(vi) Regenerants added shall be uniformly distributed over the entire media surface of upflow or downflow units. Regeneration shall be according to the media manufacturer's recommendations.

(vii) The wash rate capability shall be in excess of the manufacturers recommendation and should be at least six to eight gpm/sf of bed area.

(viii) Disinfection (see R309-520) shall be required ahead of the exchange units where this does not interfere with the media.

Where disinfection interferes with the media, disinfection shall follow the treatment process.

(c) Waste Disposal.

Waste generated by ion exchange treatment shall be disposed of in accordance with R309-525-23.

(2) Reverse Osmosis.

(a) General.

The design shall permit the easy exchange of modules for cleaning or replacement.

(b) Design Criteria.

(i) Pretreatment shall be provided per the manufacturer's recommendation.

(ii) Required equipment includes the following items: pressure gauges on the upstream and downstream side of the filter; a conductivity meter present at the site; taps for sampling permeate, concentrate and blended flows (if practiced). If a continuous conductivity meter is permanently installed, piping shall be such that the meter can be disconnected and calibrated with standard solutions at a frequency as recommended by the manufacturer.

(iii) Aeration, if practiced, shall conform with provisions of R309-535-9.

(iv) Cleaning shall be routinely done in accordance with the manufacturer's recommendations.

(v) Where the feed water pH is altered, stabilization of the finished water is mandatory.

(c) Waste Disposal.

Waste generated by reverse osmosis treatment shall be disposed of in accordance with R309-525-23.

(3) Electrodialysis.

(a) General.

(b) Design.

(i) Pretreatment shall be provided per the manufacturers recommendation.

(ii) The design shall include ability to: measure plant flow rates; measure feed temperature if the water is heated (a high temperature automatic cutoff is required to prevent membrane damage); measure D.C voltage at the first and second stages as

well as on each of the stacks. Sampling taps shall be provided to measure the conductivity of the feed water, blowdown water, and product water. D.C. and A.C. kilowatt-hour meters to record the electricity used shall also be provided.

(c) Waste Disposal.

Waste generated by electrodialysis treatment shall be disposed of in accordance with R309-525-23.

R309-535-9. Aeration.

Part 4, Section 4.5, Aeration, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition, is hereby incorporated by reference and shall govern the design and operation of aeration facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-10. Softening.

Part 4, Section 4.4, Softening, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition, is hereby incorporated by reference and shall govern the design and operation of softening facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-11. Iron and Manganese Control.

Iron and manganese control, as used herein, refers solely to treatment processes designed specifically for this purpose. The treatment process used will depend upon the character of the source water. The selection of one or more treatment processes shall meet specific local conditions as determined by engineering investigations, including chemical analyses of representative samples of water to be treated, and receive approval of the Executive Secretary. It may be necessary to operate a pilot plant in order to gather all information pertinent to the design. Consideration should be given to adjust the pH of the raw water to increase the rate of the chemical reactions involved.

Removal or treatment of iron and manganese are normally by the following methods:

(1) Removal by Oxidation, Detention and Filtration.

(a) Oxidation.

Oxidation may be by aeration, or by chemical oxidation with chlorine, potassium permanganate, ozone or chlorine dioxide.

(b) Detention.

(i) Reaction time - A minimum detention time of twenty minutes shall be provided following aeration in order to insure that the oxidation reactions are as complete as possible. This minimum detention may be omitted only where a pilot plant study indicates no need for detention. The detention basin shall be designed as a holding tank with no provisions for sludge collection but with sufficient baffling to prevent short circuiting.

(ii) Sedimentation - Sedimentation basins shall be provided

when treating water with high iron and/or manganese content, or where chemical coagulation is used to reduce the load on the filters. Provisions for sludge removal shall be made.

(c) Filtration.

(i) General - Minimum criteria relative to number, rate of filtration, structural details and hydraulics, filter media, etc., provided for rapid rate gravity filters shall apply to pressure filters where appropriate, and may be used in this application but cannot be used in the filtration of surface waters or following lime-soda softening.

(ii) Details of Design for Pressure Filter - The filters shall be designed to provide for:

(A) Loss of head gauges on the inlet and outlet pipes of each filter,

(B) An easily readable meter or flow indicator on each battery of filters,

(C) Filtration and backwashing of each filter individually with an arrangement of piping as simple as possible to accomplish these purposes,

(D) The top of the washwater collectors to be at least twenty-four (24) inches above the surface of the media,

(E) The underdrain system to efficiently collect the filtered water and to uniformly distribute the backwash water at a rate capable of not less than 15 gpm/sf of filter area,

(F) Backwash flow indicators and controls that are easily readable while operating the control valves,

(G) An air release valve on the highest point of each filter,

(H) An accessible manhole to facilitate inspections and repairs,

(I) Means to observe the wastewater and filters during backwashing, and

(J) Construction to prevent cross-connection.

(2) Removal by the Lime-soda Softening Process.

For removal by the lime-soda softening process refer to Part 4, Section 4.4, Softening, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition as indicated in R309-535-10.

(3) Removal by Manganese Greensand Filtration.

This process, consisting of the continuous feed of potassium permanganate to the influent of a manganese greensand filter, is more applicable to the removal of manganese than the removal of iron.

(a) Provisions shall be made to apply the permanganate as far ahead of the filter as practical and at a point immediately before the filter.

(b) An anthracite media cap of at least six inches shall be provided over manganese greensand.

(c) The normal filtration rate is three gpm/sf.

(d) The normal wash rate is 8 to 10 gpm/sf.

(e) Air washing shall be provided.

(f) Sample taps shall be provided:

(i) prior to application of permanganate,

(ii) immediately ahead of filtration,

(iii) at a point between the anthracite media and the manganese greensand,

(iv) halfway down the manganese greensand, and

(v) at the filter effluent.

(4) Removal by Ion Exchange.

This process is not acceptable where either the source water or wash water contains dissolved oxygen.

(5) Sequestration by Polyphosphates.

This process shall not be used when iron, manganese or a combination thereof exceeds 1.0 milligram per liter. The total phosphate applied shall not exceed 10 milligrams per liter as PO_4. Where phosphate treatment is used, satisfactory chlorine residuals shall be maintained in the distribution system and the following required:

(a) feeding equipment shall conform to the requirements of R309-525-11(7),

(b) stock phosphate solution shall be kept covered and disinfected by carrying approximately 10 mg/l free chlorine residual,

(c) polyphosphates shall not be applied ahead of iron and manganese removal treatment. If no iron or manganese removal treatment is provided, the point of application shall be prior to any aeration, oxidation or disinfection steps, and

(d) phosphate chemicals must comply with ANSI/NSF Standard 60.

Sampling taps shall be provided for control purposes. Taps shall be located on each raw water source, and on each treatment unit influent and effluent.

Waste generated by iron and manganese control treatment shall be disposed of in accordance with R309-525-23.

R309-535-12. Point-of-Use and Point-of-Entry Treatment Devices.

Where drinking water does not meet the quality standards of R309-200 and the available water system treatment methods are determined to be unreasonably costly or otherwise undesirable, the Executive Secretary may permit the public water supplier to install and maintain point-of-use or point-of-entry treatment devices. This approval shall only be given after receipt and satisfactory review of the following items.

(1) The Executive Secretary shall only consider approving point-of-use or point-of-entry treatment upon receipt of an analysis that clearly demonstrates that central treatment is not feasible for the public water system. Unless waived by the Executive Secretary, this analysis shall be in the form of an engineering report prepared by a professional engineer registered in the State of Utah. Systems serving fewer than 75 connections are excused from performing an analysis by a Registered Professional Engineer.

(2) The water system shall have a signed access agreement with each customer that allows water system personnel to enter their property on a scheduled basis to install and maintain the treatment devices. The agreement shall include educational information with regard to the health risks of consuming or cooking with water from non-treated taps. Systems with an initial

75% of their connections under a signed access agreement shall be allowed to proceed with the understanding that 100% of their connections are due within a 5 year period. For public water systems that own or control all connections to the public water system, this requirement will not apply.

(3) Documentation that legal authority, which includes a termination of service clause, has been adopted to ensure water system access to the property for installation, maintenance, servicing and sampling of each treatment unit. For public water systems that own or control all connections to the public water system, this requirement will not apply.

(4) Point-of-use or point-of-entry treatment devices used shall only be those proven to be appropriate, safe and effective as determined through testing and compliance with protocols established by EPA's Environmental Technology Verification Program (ETV) or the applicable ANSI/NSF Standard(s). A pilot study may be required to determine the suitability of the point-of-use or point-of-entry device in treating a particular source water. The scope and duration of the pilot study shall be determined by such factors as the characteristics of the raw water, manufacturer's ratings of the treatment device, and good engineering practices. The pilot study will generate data on service intervals, aid in specifying and calibrating alarm systems, and reveal any site specific problems with component fouling or microbial colonization.

(5) The water system shall provide an operation and maintenance plan demonstrating that the treatment units shall be installed and serviced in accordance with the manufacturer's instructions and that compliance sampling as required in R309-215-6 shall take place. The system shall provide documentation of an operation and maintenance contract or schedule annually as required in R309-105-16(4). If the operation and maintenance of the POU/POE devices is performed by water system personnel, it shall only be performed by a water operator certified at the level of the water system.

(6) The performance indicating device for the point-of-use/point-of-entry treatment device that will be used shall be specified in the submital for plan approval.

(7) The water system shall submit a customer education and out-reach plan that includes at a minimum annual frequency of contact.

(8) Point-of-use or point-of-entry treatment devices for compliance with the nitrate MCL shall only be considered if treatment is provided at all taps that are accessible to the public.

R309-535-13. New Treatment Processes or Equipment.

The policy of the Board is to encourage, rather than to obstruct, the development of new methods and equipment for the treatment of water. Nevertheless, any new processes or equipment must have been thoroughly tested in full-scale, comparable installations, before approval of plans can be issued. The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate

the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. NSF International (NSF) in cooperation with the EPA operates the Package Drinking Water Treatment Systems (PDWTS) pilot, one of 12 technology areas under ETV. Engineers and Manufacturers are referred to [~~Bruce Bartley,~~] Manager, ETV project, NSF International, P.O. Box 130140, Ann Arbor, Michigan 48113-0140.

No new treatment process will be approved for use in Utah unless the designer or supplier can present evidence satisfactory to the Executive Secretary that the process will insure the delivery of water of safe, sanitary quality, without imposing undue problems of supervision, operation and/or control.

KEY: drinking water, miscellaneous treatment, stabilization, iron and manganese control
Date of Enactment or Last Substantive Amendment: November 16, 2005
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-535. Facility Design and Operation: Miscellaneous Treatment Methods.
R309-535-1. Purpose.

The purpose of this rule is to provide specific requirements for miscellaneous water treatment methods which are primarily intended to remove chemical contaminants from drinking water; or, adjust the chemical composition of drinking water. It is intended to be applied in conjunction with other rules, specifically R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-535-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-535-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-535-4. General.

For each process described in this section pertinent rules are given. The designer must also, however, incorporate the relevant rules given in other sections into the plans and specifications for any of these specialized treatment methods. Where applicable, the following topics must be addressed:

(1) Plant Siting (see R309-525-6).
(2) Plant Reliability (see R309-525-7).
(3) Color Coding and Pipe Marking (see R309-525-8).
(4) Chemical Addition (see R309-525-11).
(5) Miscellaneous Plant Facilities (see R309-525-17, particularly sub-section R309-525-17(1), Laboratory).
(6) Operation and Maintenance Manuals (see R309-525-19).
(7) Safety (see R309-525-21).
(8) Disposal of Treatment Plant Waste (see R309-525-23).
(9) Disinfection (see R309-520).

R309-535-5. Fluoridation.

Sodium fluoride, sodium silicofluoride and fluorosilicic acid shall conform to the applicable AWWA standards and/or ANSI/NSF Standard 60. Other fluoride compounds which may be available must be approved by the Executive Secretary.

(1) Fluoride compound storage.

Fluoride chemicals should be isolated from other chemicals to prevent contamination. Compounds shall be stored in covered or unopened shipping containers and should be stored inside a

building. Unsealed storage units for fluorosilicic acid should be vented to the atmosphere at a point outside any building. Bags, fiber drums and steel drums should be stored on pallets.

(2) Chemical feed equipment and methods.

In addition to the requirements in R309-525-11 "Chemical Addition", fluoride feed equipment shall meet the following requirements:

(a) scales, loss-of-weight recorders or liquid level indicators, as appropriate, accurate to within five percent of the average daily change in reading shall be provided for chemical feeds,

(b) feeders shall be accurate to within five percent of any desired feed rate,

(c) fluoride compound shall not be added before lime-soda softening or ion exchange softening,

(d) the point of application of fluorosilicic acid, if into a horizontal pipe, shall be in the lower half of the pipe,

(e) a fluoride solution shall be applied by a positive displacement pump having a stroke rate not less than 20 strokes per minute,

(f) a spring opposed diaphragm type anti-siphon device shall be provided for all fluoride feed lines and dilution water lines,

(g) a device to measure the flow of water to be treated is required,

(h) the dilution water pipe shall terminate at least two pipe diameters above the solution tank,

(i) water used for sodium fluoride dissolution shall be softened if hardness exceeds 75 mg/l as calcium carbonate,

(j) fluoride solutions shall be injected at a point of continuous positive pressure or a suitable air gap provided,

(k) the electrical outlet used for the fluoride feed pump should have a nonstandard receptacle and shall be interconnected with the well or service pump,

(l) saturators should be of the upflow type and be provided with a meter and backflow protection on the makeup water line.

(m) lead weights shall not be used in fluoride chemical solutions to keep pump suction lines at the bottom of a day or bulk storage tank.

(3) Secondary controls.

Secondary control systems for fluoride chemical feed devices shall be provided as a means of reducing the possibility for overfeed; these may include flow or pressure switches or other devices.

(4) Protective equipment.

Personal protective equipment as outlined in R309-525-11(10) shall be provided for operators handling fluoride compounds. Deluge showers and eye wash devices shall be provided at all fluorosilicic acid installations.

(5) Dust control.

(a) Provision must be made for the transfer of dry fluoride compounds from shipping containers to storage bins or hoppers in such a way as to minimize the quantity of fluoride dust which may enter the room in which the equipment is installed. The enclosure shall be provided with an exhaust fan and dust filter which place

the hopper under a negative pressure. Air exhausted from fluoride handling equipment shall discharge through a dust filter to the outside atmosphere of the building.

(b) Provision shall be made for disposing of empty bags, drums or barrels in a manner which will minimize exposure to fluoride dusts. A floor drain should be provided to facilitate the hosing of floors.

(6) Testing equipment.

Equipment shall be provided for measuring the quantity of fluoride in the water. Such equipment shall be subject to the approval of the Executive Secretary.

R309-535-6. Taste and Odor Control.

Part 4, Section 4.9, Taste and Odor Control, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and shall govern the design and operation of taste and odor control facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-7. Stabilization.

Part 4, Section 4.8, Stabilization, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition is hereby incorporated by reference and it shall govern the design and operation of stabilization facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-8. Deionization.

Current practical methods of deionization include Ion Exchange, Reverse Osmosis and Electrodialysis. Additional methods of deionization may be approved subject to the presentation of evidence of satisfactory reliability.

All properly developed groundwater sources having water quality exceeding 2,000 mg/l Total Dissolved Solids and/or 500 mg/l Sulfate shall be either properly diluted or treated by the methods outlined in this section. Deionization cannot be considered a substitute process for conventional complete treatment outlined in R309-525.

(1) Ion Exchange.

(a) General.

Great care shall be taken by the designer to avoid loading the media with water high in organics.

(b) Design.

(i) Pretreatment shall be provided per the manufacturer's recommendation.

(ii) Upflow or down flow units are acceptable.

(iii) Exchangers shall have at least a three foot media depth.

(iv) Exchangers shall be designed to meet the

recommendations of the media manufacturer with regard to flow rate or contact time. In any case, flow shall not exceed seven gpm/sf of bed area. The plant shall be provided with an influent or effluent meter as well as a meter on any bypass line.

(v) Chemical feeders used shall conform with R309-525-8. All solution tanks shall be covered.

(vi) Regenerants added shall be uniformly distributed over the entire media surface of upflow or downflow units. Regeneration shall be according to the media manufacturer's recommendations.

(vii) The wash rate capability shall be in excess of the manufacturers recommendation and should be at least six to eight gpm/sf of bed area.

(viii) Disinfection (see R309-520) shall be required ahead of the exchange units where this does not interfere with the media.

Where disinfection interferes with the media, disinfection shall follow the treatment process.

(c) Waste Disposal.

Waste generated by ion exchange treatment shall be disposed of in accordance with R309-525-23.

(2) Reverse Osmosis.

(a) General.

The design shall permit the easy exchange of modules for cleaning or replacement.

(b) Design Criteria.

(i) Pretreatment shall be provided per the manufacturer's recommendation.

(ii) Required equipment includes the following items: pressure gauges on the upstream and downstream side of the filter; a conductivity meter present at the site; taps for sampling permeate, concentrate and blended flows (if practiced). If a continuous conductivity meter is permanently installed, piping shall be such that the meter can be disconnected and calibrated with standard solutions at a frequency as recommended by the manufacturer.

(iii) Aeration, if practiced, shall conform with provisions of R309-535-9.

(iv) Cleaning shall be routinely done in accordance with the manufacturer's recommendations.

(v) Where the feed water pH is altered, stabilization of the finished water is mandatory.

(c) Waste Disposal.

Waste generated by reverse osmosis treatment shall be disposed of in accordance with R309-525-23.

(3) Electrodialysis.

(a) General.

(b) Design.

(i) Pretreatment shall be provided per the manufacturers recommendation.

(ii) The design shall include ability to: measure plant flow rates; measure feed temperature if the water is heated (a high temperature automatic cutoff is required to prevent membrane damage); measure D.C voltage at the first and second stages as

well as on each of the stacks. Sampling taps shall be provided to measure the conductivity of the feed water, blowdown water, and product water. D.C. and A.C. kilowatt-hour meters to record the electricity used shall also be provided.

(c) Waste Disposal.

Waste generated by electrodialysis treatment shall be disposed of in accordance with R309-525-23.

R309-535-9. Aeration.

Part 4, Section 4.5, Aeration, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition, is hereby incorporated by reference and shall govern the design and operation of aeration facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-10. Softening.

Part 4, Section 4.4, Softening, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition, is hereby incorporated by reference and shall govern the design and operation of softening facilities. This document is published by the Great Lakes-Upper Mississippi River Board of Public Health and Environmental Managers. A copy is available in the office of the Division for reference.

R309-535-11. Iron and Manganese Control.

Iron and manganese control, as used herein, refers solely to treatment processes designed specifically for this purpose. The treatment process used will depend upon the character of the source water. The selection of one or more treatment processes shall meet specific local conditions as determined by engineering investigations, including chemical analyses of representative samples of water to be treated, and receive approval of the Executive Secretary. It may be necessary to operate a pilot plant in order to gather all information pertinent to the design. Consideration should be given to adjust the pH of the raw water to increase the rate of the chemical reactions involved.

Removal or treatment of iron and manganese are normally by the following methods:

(1) Removal by Oxidation, Detention and Filtration.

(a) Oxidation.

Oxidation may be by aeration, or by chemical oxidation with chlorine, potassium permanganate, ozone or chlorine dioxide.

(b) Detention.

(i) Reaction time - A minimum detention time of twenty minutes shall be provided following aeration in order to insure that the oxidation reactions are as complete as possible. This minimum detention may be omitted only where a pilot plant study indicates no need for detention. The detention basin shall be designed as a holding tank with no provisions for sludge collection but with sufficient baffling to prevent short circuiting.

(ii) Sedimentation - Sedimentation basins shall be provided

when treating water with high iron and/or manganese content, or where chemical coagulation is used to reduce the load on the filters. Provisions for sludge removal shall be made.

(c) Filtration.

(i) General - Minimum criteria relative to number, rate of filtration, structural details and hydraulics, filter media, etc., provided for rapid rate gravity filters shall apply to pressure filters where appropriate, and may be used in this application but cannot be used in the filtration of surface waters or following lime-soda softening.

(ii) Details of Design for Pressure Filter - The filters shall be designed to provide for:

(A) Loss of head gauges on the inlet and outlet pipes of each filter,

(B) An easily readable meter or flow indicator on each battery of filters,

(C) Filtration and backwashing of each filter individually with an arrangement of piping as simple as possible to accomplish these purposes,

(D) The top of the washwater collectors to be at least twenty-four (24) inches above the surface of the media,

(E) The underdrain system to efficiently collect the filtered water and to uniformly distribute the backwash water at a rate capable of not less than 15 gpm/sf of filter area,

(F) Backwash flow indicators and controls that are easily readable while operating the control valves,

(G) An air release valve on the highest point of each filter,

(H) An accessible manhole to facilitate inspections and repairs,

(I) Means to observe the wastewater and filters during backwashing, and

(J) Construction to prevent cross-connection.

(2) Removal by the Lime-soda Softening Process.

For removal by the lime-soda softening process refer to Part 4, Section 4.4, Softening, in the Recommended Standards for Water Works (commonly known as "Ten State Standards"), 2007 [~~1997~~] edition as indicated in R309-535-10.

(3) Removal by Manganese Greensand Filtration.

This process, consisting of the continuous feed of potassium permanganate to the influent of a manganese greensand filter, is more applicable to the removal of manganese than the removal of iron.

(a) Provisions shall be made to apply the permanganate as far ahead of the filter as practical and at a point immediately before the filter.

(b) An anthracite media cap of at least six inches shall be provided over manganese greensand.

(c) The normal filtration rate is three gpm/sf.

(d) The normal wash rate is 8 to 10 gpm/sf.

(e) Air washing shall be provided.

(f) Sample taps shall be provided:

(i) prior to application of permanganate,

(ii) immediately ahead of filtration,

(iii) at a point between the anthracite media and the manganese greensand,

(iv) halfway down the manganese greensand, and

(v) at the filter effluent.

(4) Removal by Ion Exchange.

This process is not acceptable where either the source water or wash water contains dissolved oxygen.

(5) Sequestration by Polyphosphates.

This process shall not be used when iron, manganese or a combination thereof exceeds 1.0 milligram per liter. The total phosphate applied shall not exceed 10 milligrams per liter as PO_4. Where phosphate treatment is used, satisfactory chlorine residuals shall be maintained in the distribution system and the following required:

(a) feeding equipment shall conform to the requirements of R309-525-11(7),

(b) stock phosphate solution shall be kept covered and disinfected by carrying approximately 10 mg/l free chlorine residual,

(c) polyphosphates shall not be applied ahead of iron and manganese removal treatment. If no iron or manganese removal treatment is provided, the point of application shall be prior to any aeration, oxidation or disinfection steps, and

(d) phosphate chemicals must comply with ANSI/NSF Standard 60.

Sampling taps shall be provided for control purposes. Taps shall be located on each raw water source, and on each treatment unit influent and effluent.

Waste generated by iron and manganese control treatment shall be disposed of in accordance with R309-525-23.

R309-535-12. Point-of-Use and Point-of-Entry Treatment Devices.

Where drinking water does not meet the quality standards of R309-200 and the available water system treatment methods are determined to be unreasonably costly or otherwise undesirable, the Executive Secretary may permit the public water supplier to install and maintain point-of-use or point-of-entry treatment devices. This approval shall only be given after receipt and satisfactory review of the following items.

(1) The Executive Secretary shall only consider approving point-of-use or point-of-entry treatment upon receipt of an analysis that clearly demonstrates that central treatment is not feasible for the public water system. Unless waived by the Executive Secretary, this analysis shall be in the form of an engineering report prepared by a professional engineer registered in the State of Utah. Systems serving fewer than 75 connections are excused from performing an analysis by a Registered Professional Engineer.

(2) The water system shall have a signed access agreement with each customer that allows water system personnel to enter their property on a scheduled basis to install and maintain the treatment devices. The agreement shall include educational information with regard to the health risks of consuming or cooking with water from non-treated taps. Systems with an initial

75% of their connections under a signed access agreement shall be allowed to proceed with the understanding that 100% of their connections are due within a 5 year period. For public water systems that own or control all connections to the public water system, this requirement will not apply.

(3) Documentation that legal authority, which includes a termination of service clause, has been adopted to ensure water system access to the property for installation, maintenance, servicing and sampling of each treatment unit. For public water systems that own or control all connections to the public water system, this requirement will not apply.

(4) Point-of-use or point-of-entry treatment devices used shall only be those proven to be appropriate, safe and effective as determined through testing and compliance with protocols established by EPA's Environmental Technology Verification Program (ETV) or the applicable ANSI/NSF Standard(s). A pilot study may be required to determine the suitability of the point-of-use or point-of-entry device in treating a particular source water. The scope and duration of the pilot study shall be determined by such factors as the characteristics of the raw water, manufacturer's ratings of the treatment device, and good engineering practices. The pilot study will generate data on service intervals, aid in specifying and calibrating alarm systems, and reveal any site specific problems with component fouling or microbial colonization.

(5) The water system shall provide an operation and maintenance plan demonstrating that the treatment units shall be installed and serviced in accordance with the manufacturer's instructions and that compliance sampling as required in R309-215-6 shall take place. The system shall provide documentation of an operation and maintenance contract or schedule annually as required in R309-105-16(4). If the operation and maintenance of the POU/POE devices is performed by water system personnel, it shall only be performed by a water operator certified at the level of the water system.

(6) The performance indicating device for the point-of-use/point-of-entry treatment device that will be used shall be specified in the submital for plan approval.

(7) The water system shall submit a customer education and out-reach plan that includes at a minimum annual frequency of contact.

(8) Point-of-use or point-of-entry treatment devices for compliance with the nitrate MCL shall only be considered if treatment is provided at all taps that are accessible to the public.

R309-535-13. New Treatment Processes or Equipment.

The policy of the Board is to encourage, rather than to obstruct, the development of new methods and equipment for the treatment of water. Nevertheless, any new processes or equipment must have been thoroughly tested in full-scale, comparable installations, before approval of plans can be issued. The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate

the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. NSF International (NSF) in cooperation with the EPA operates the Package Drinking Water Treatment Systems (PDWTS) pilot, one of 12 technology areas under ETV. Engineers and Manufacturers are referred to [~~Bruce Bartley,~~] Manager, ETV project, NSF International, P.O. Box 130140, Ann Arbor, Michigan 48113-0140.

No new treatment process will be approved for use in Utah unless the designer or supplier can present evidence satisfactory to the Executive Secretary that the process will insure the delivery of water of safe, sanitary quality, without imposing undue problems of supervision, operation and/or control.

KEY: drinking water, miscellaneous treatment, stabilization, iron and manganese control
Date of Enactment or Last Substantive Amendment: November 16, 2005
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-540. Facility Design and Operation: Pump Stations.
R309-540-1. Purpose.

The purpose of this rule is to provide specific requirements for pump stations utilized to deliver drinking water to facilities of public water systems. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-540-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-540-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-540-4. General.

Pumping stations shall be designed to maintain the sanitary quality of water and to provide ample quantities of water at sufficient pressure.

R309-540-5. Pumping Facilities.

(1) Location.

(a) The pumping station shall be designed such that:

(i) the proposed site will meet the requirements for sanitary protection of water quality, hydraulics of the system, and protection against interruption of service by fire, flood or any other hazard;

(ii) the access to the pump station shall be six inches above the surrounding ground and the station located at an elevation which is a minimum of three feet above the 100-year flood elevation, or three feet above the highest recorded flood elevation, which ever is higher, or protected to such elevations;

(iii) the station is readily accessible at all times unless permitted to be out of service for the period of inaccessibility;

(iv) surrounding ground is graded so as to lead surface drainage away from the station; and

(v) the station is protected to prevent vandalism and entrance by animals or unauthorized persons.

(2) Pumping Stations.

(a) Building structures for both raw and drinking water shall:

(i) have adequate space for the installation of additional pumping units if needed, and for the safe servicing of all equipment;

(ii) be of durable construction, fire and weather resistant, with outward-opening doors;

(iii) have an interior floor elevation at least six inches above the exterior finished grade;

(iv) have any underground facilities, especially wet wells, waterproofed;

(v) have all interior floors drained in such a manner that the quality of drinking water contained in any wet wells will not be endangered. All floors shall slope at least one percent (one foot every 100 feet) to a suitable drain; and

(vi) provide a suitable outlet for drainage from pump glands without discharging onto the floor.

(b) Suction wells shall:

(i) be watertight;

(ii) have floors sloped to permit removal of water and entrained solids;

(iii) be covered or otherwise protected against contamination; and

(iv) have two pumping compartments or other means to allow the suction well to be taken out of service for inspection, maintenance, or repair.

(c) Servicing equipment shall consist of:

(i) crane-ways, hoist beams, eyebolts, or other adequate facilities for servicing or removal of pumps, motors or other heavy equipment;

(ii) openings in floors, roofs or wherever else needed for removal of heavy or bulky equipment; and

(iii) a convenient tool board, or other facilities as needed, for proper maintenance of the equipment.

(d) Stairways and ladders shall:

(i) be provided between all floors, and in pits or compartments which must be entered; and

(ii) have handrails on both sides, and treads of non-slip material. They shall have risers not exceeding nine inches and treads wide enough for safety.

(e) Heating provisions shall be adequate for:

(i) the comfort of the operator; and

(ii) the safe and efficient operation of the equipment.

(f) Ventilation shall:

(i) conform to existing local and/or state codes; and

(ii) forced ventilation of at least six changes of air per hour shall be provided for all rooms, compartments, pits and other enclosures below ground floor, and any area where unsafe atmosphere may develop or where excessive heat may be built up.

(g) Lighting.

Pump stations shall be adequately lighted throughout. All electrical work shall conform to the requirements of the relevant state and/or local building codes.

(h) Sanitary and other conveniences.

Plumbing shall be so installed as to prevent contamination of a public water supply. Wastes shall be discharged in accordance with the plumbing code, R317-4, or R317-1-3.

(3) Pumps.

(a) Capacity.

Capacity shall be provided such that the pump or pumps shall be capable of providing the peak day demand of the system or the specific portion of the system serviced.

The pumping units shall:

(i) have ample capacity to supply the peak day demand against the required distribution system pressure without dangerous overloading;

(ii) be driven by prime movers able to meet the maximum horsepower condition of the pumps without use of service factors;

(iii) be provided readily available spare parts and tools; and

(iv) be served by control equipment that has proper heater and overload protection for air temperature encountered.

(b) Suction Lift.

Suction lift, where possible, shall be avoided. If suction lift is necessary, the required lift shall be within the pump manufacturer's recommended limits and provision shall be made for priming the pumps.

(c) Priming.

Prime water shall not be of lesser sanitary quality than that of the water being pumped. Means shall be provided to prevent back siphonage. When an air-operated ejector is used, the screened intake shall draw clean air from a point at least 10 feet above the ground or other source.

(4) Booster Pumps.

(a) Booster pumps shall be located or controlled so that:

(i) they will not produce negative pressure in their suction lines;

(ii) automatic cutoff pressure shall be at least 10 psi in the suction line;

(iii) automatic or remote control devices shall have a range between the start and cutoff pressure which will prevent excessive cycling; and

(iv) a bypass is available.

(b) Inline booster pumps (pumps withdrawing water directly from distribution lines without the benefit of storage and feeding such water directly into other distribution lines rather than storage), in addition to the other requirements of this section, shall have at least two pumping units (such that with any one pump out of service, the remaining pump or pumps shall be capable of providing the peak day demand of the specific portion of the system serviced), shall be accessible for servicing and repair and located or controlled so that the intake pressure shall be at least 20 psi when the pump or pumps are in normal operation.

(c) Individual home booster pumps shall not be allowed for any individual service from the public water supply main.

(5) Automatic and remote controlled stations.

All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. Installation of electrical equipment shall conform with the applicable state and local electrical codes and the National Electrical Code.

(6) Appurtenances.

(a) Valves.

Valves shall be used to permit satisfactory operation, maintenance, and repair of the equipment. If foot valves are necessary, they shall have a net valve area of at least 2 1/2 times the area of the suction pipe and they shall have a positive-acting check valve on the discharge side between the pump and the shut-off valve.

(b) Piping.

Piping within and near pumping stations shall:

(i) be designed so that the friction losses will be minimized;

(ii) not be subject to contamination;

(iii) have watertight joints;

(iv) be protected against surge or water hammer; and

(v) be such that each pump has an individual suction line or that the lines shall be so manifolded that they will insure similar hydraulic and operating conditions.

(c) Gauges and Meters.

Each pump shall:

(i) have a standard pressure gauge on its discharge line;

(ii) have a compound gauge (capable of indicating negative pressure or vacuum as well as positive pressure) on its suction line; and

(iii) have recording gauges in the larger stations.

(d) Water Seal.

Where pumps utilize water seals, the seals shall:

(i) not be supplied with water of a lesser sanitary quality than that of the water being pumped; and

(ii) when pumps are sealed with potable water and are pumping water of lesser sanitary quality, the seal shall be provided with a break tank open to atmospheric pressure, and have an air gap of at least six inches or two pipe diameters, whichever is greater, between the feeder line and the spill line of the tank.

(e) Controls.

Controls shall be designed in such a manner that they will operate their prime movers, and accessories, at the rated capacity without dangerous overload. Where two or more pumps are installed, provision shall be made for alternation. Provision shall be made to prevent energizing the motor in the event of a backspin cycle. Electrical controls shall be protected against flooding. Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation.

(f) Standby Power.

Standby power, to ensure continuous service when the primary power has been interrupted, shall be provided from at least two independent sources or a standby or an auxiliary source shall be provided. If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination.

(g) Water Pre-Lubrication.

When automatic pre-lubrication of pump bearings is necessary and an auxiliary direct drive power supply is provided, the pre-

lubrication line shall be provided with a valved bypass around the automatic control so that the bearings can, if necessary, be lubricated manually before the pump is started or the pre-lubrication controls shall be wired to the auxiliary power supply.

R309-540-6. Hydropneumatic Systems.

(1) General.

Hydropneumatic systems shall comply with all appropriate sections of R309-540-5.

Unpressurized ground level or elevated storage, designed in accordance with R309-545, shall be provided in addition to the diaphragm or air tanks. Diaphragm or air pressure tank storage shall not be considered for fire protection purposes or effective system storage.

(2) Location.

If diaphragm or air tanks and appurtenances are located below ground, adequate provisions for drainage, ventilation, maintenance, and flood protection shall be made and the electrical controls shall be located above grade so as to be protected from flooding as required by R309-540-5(6)(e). Any discharge piping from combination air release/vacuum relief valves(air/vac's) or pressure relief valves located in below ground chambers shall comply with all the pertinent requirements of R309-550-6(6).

(3) Operating Pressures.

The system shall be designed to provide minimum pressures in R309-105-9 at all points in the distribution system. A pressure gauge shall be installed on the pressure tank inlet line.

(4) Piping.

In addition to the bypass required by R309-540-5(4)(iv) on the pumps, the diaphragm or air tanks shall have sufficient bypass piping to permit operation of the hydropneumatic system while one or more of the tanks are being repaired or painted.

(5) Pumps.

At least two pumping units shall be provided. With any pump out of service the remaining pump or pumps shall be capable of providing the peak instantaneous demand of the system as described in R309-510-9(2), while recharging the pressure tank at 115 percent of the upper pressure setting. Pump cycling shall not exceed 15 starts per hour, with a maximum of ten starts per hour preferred.

(6) Pressure Tanks.

(a) Pressure tanks shall meet the requirement of state and local laws and regulations for the manufacture and installation of unfired pressure vessels. Interior coatings or diaphragms used in pressure tanks that will come into contact with the drinking water shall comply with ANSI/NSF Standard 61. Non diaphragm pressure tanks shall have an access manhole, a drain, control equipment consisting of pressure gauge, water sight glass, automatic or manual air blow-off, means for adding air, and pressure operated start-stop controls for the pumps.

(b) The minimum volume of the pressure tank or combination of tanks shall be greater than or equal to the sum of S and the value of CX divided by 4W.

where the following values are used in the equation above:

C = minutes per operating cycle, four minutes to meet the requirements of R309-540-6(5) above or preferably six minutes, and is equal to pump ON time plus pump OFF time.

X = output capacity rating of the pump(s) at the high pressure condition in the tank(s), in gpm.

W = percent of volume withdrawn during a given drop in tank pressure: specifically, between P_h and P_l. $W = 100(P_h - P_l)/P_h$ where P_h = high pressure in tank in psia (high absolute pressure) and P_l = low pressure in tank is psia (low absolute pressure). Values of W range typically from 0.26 to 0.31 for pressure differentials of 15 to 30 psi and high system pressures of 45 to 85 psi at elevations of approximately 5,000 feet.

S = water seal volume in gallons, the volume of inactive water remaining in tank at low pressure condition.

(7) Air Volume.

The method of adjusting the air volume shall be acceptable to the Executive Secretary. Air delivered by compressors to the pressure tank shall be adequately filtered, oil free, and be of adequate volume. Any intake shall be screened and draw clean air from a point at least 10 feet above the ground or other source of possible contamination, unless the air is filtered by an apparatus approved by the Executive Secretary. Discharge piping from air relief valves shall be designed and installed with screens to eliminate the possibility of contamination from this source.

(8) Water Seal.

For air pressure tanks without an internal diaphragm the volume of water remaining in a air pressure tank at the lower pressure setting shall be sufficient to provide an adequate water seal at the outlet to prevent the leakage of air.

The following water seal depths shall be considered as minimum requirements.

(a) Horizontal outlets shall maintain sufficient depth, as measured from the centerline of the horizontal outlet pipe, such that the depth is greater than or equal to the sum of d and twice the value v^2 divided by 2G.

(b) Vertical outlets, if unbaffled, the depth shall be the same as in (a) except measured from the pipe outlet; if baffled, the depth shall be greater than or equal to the value v^2 divided by 2G.

where the following values are used in the equations above:

v = the axial velocity in the pipe outlet for the peak instantaneous demand flow rate of the system.

d = the diameter of the outlet pipe in ft.

G = the gravitational constant of 32.2 ft/sec/sec.

(9) Standby Power Supply.

Where a hydropneumatic system is intended to serve a public water system, categorized as a community water system as defined in R309-110, a standby source of power shall be provided.

KEY: drinking water, pumps, hydropneumatic systems, individual home booster pumps
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Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-545. Facility Design and Operation: Drinking Water Storage Tanks.
R309-545-1. Purpose.

The purpose of this rule is to provide specific requirements for public drinking water storage tanks. It is intended to be applied in conjunction with other rules, specifically R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-545-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-545-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-545-4. General.

Storage for drinking water shall be provided as an integral part of each public drinking water system unless an exception to rule is approved by the Executive Secretary. Pipeline volume in transmission or distribution lines shall not be considered part of any storage volumes.

R309-545-5. Size of Tank(s).

Required Storage Capacity: In the absence of firm water use data, at or above the 90% confidence level, storage tanks shall be sized in accordance with the recommended minimums of R309-510.

R309-545-6. Tank Material and Structural Adequacy.

(1) Materials.

The materials used in drinking water storage structures shall provide stability and durability as well as protect the quality of the stored water. Steel tanks shall be constructed from new, previously unused, plates and designed in accordance with AWWA Standard D-100.

(2) Structural Design.

The structural design of drinking water storage structures shall be sufficient for the environment in which they are located. The design shall incorporate a careful analysis of potential seismic risks.

R309-545-7. Location of Tanks.

(1) Pressure Considerations.

The location of the reservoir and the design of the water system shall be such that the minimum working pressure in the

distribution system shall meet the minimum pressures as required in R309-105-9.

(2) Connections.

Tanks shall be located at an elevation where present and anticipated connections can be adequately served. System connections shall not be placed at elevations such that minimum pressures as required in R309-105-9 cannot be continuously maintained.

(3) Sewer Proximity.

Sewers, drains, standing water, and similar sources of possible contamination shall be kept at least 50 horizontal feet from the reservoir.

(4) Standing Surface Water.

The area surrounding a ground-level drinking water storage structure shall be graded in a manner that will prevent surface water from standing within 50 horizontal feet of the structure.

(5) Ability to Isolate.

Drinking water storage structures shall be designed and located so that they can be isolated from the distribution system. Storage structures shall be capable of being drained for cleaning or maintenance without necessitating loss of pressure in the distribution system.

(6) Earthquake and Landslide Risks.

Potential geologic hazards shall be taken into account in selecting a tank location. Earthquake and landslide risks shall be evaluated.

(7) Security.

The site location and design of a drinking water storage reservoir shall take into consideration security issues and potential for vandalism.

R309-545-8. Tank Burial.

(1) Flood Elevation.

The bottom of drinking water storage reservoirs shall be located at least three feet above the 100 year flood level or the highest known maximum flood elevation, whichever is higher.

(2) Ground Water.

When the bottom of a drinking water storage reservoir is to be below normal ground surface, it shall be placed above the local ground water table elevation.

(3) Covered Roof.

When the roof of a drinking water storage reservoir is to be covered by earth, the roof shall be sloped to drain toward the outside edge of the tank.

R309-545-9. Tank Roof and Sidewalls.

(1) Protection From Contamination.

All drinking water storage structures shall have suitable watertight roofs and sidewalls which shall also exclude birds, animals, insects, and excessive dust.

(2) Openings.

Openings in the roof and sidewalls shall be kept to a minimum and comply with the following:

(a) Any pipes running through the roof or sidewall of a

metal drinking water storage structure shall be welded, or properly gasketed. In new concrete tanks, these pipes shall be connected to standard wall castings with seepage rings which have been poured in place. Vent pipes, in addition[~~s~~] to seepage rings, shall have raised concrete curbs which direct water away from the vent pipe and are formed as a single pour with the roof deck. No roof drains or any other pipes which may contain water of less quality than drinking water shall ever penetrate the roof, walls, or floor of a drinking water storage tank.

(b) Openings in a storage structure roof or top, designated to accommodate control apparatus or pump columns, shall be welded, gasketed, or curbed and sleeved as above, and shall have additional proper shielding to prevent vandalism.

(c) Openings shall be kept as far away as possible from the storage tank outlet and other sources of surface water.

(3) Adjacent Compartments.

Drinking water shall not be stored or conveyed in a compartment adjacent to wastewater when the two compartments are separated by a single wall.

(4) Slope of Roof.

The roof of all storage structures shall be designed for drainage. Parapets, or similar construction which would tend to hold water and snow, shall not be utilized unless adequate waterproofing and drainage are provided. Downspout or roof drain pipes shall not enter or pass through the reservoir.

R309-545-10. Internal Features.

The following shall apply to internal features of drinking water storage structures:

(1) Drains.

If a drain is provided, it shall not discharge to a sanitary sewer. If local authority allows discharge to a storm drain, the drain discharge shall have a physical air gap of at least two pipe diameters between the discharge end of the pipe and the overflow rim of the receiving basin.

(2) Internal Catwalks.

Internal catwalks, if provided and located so as to be over the drinking water, shall have a solid floor with raised edges. The edges and floor shall be so designed that shoe scrapings or dirt will not fall into the drinking water.

(3) Inlet and Outlet.

To minimize potential sediment flow from the structure, the normal outlet pipes from all reservoirs shall be located in a manner to provide a silt trap prior to discharge into the distribution system.

(4) Disinfection.

If the drinking water reservoir is to be utilized as a contact basin for disinfection purposes, the design engineer shall conduct tracer studies or other tests, previously approved by the Executive Secretary, to determine the minimum contact time and the potential for short circuiting.

R309-545-11. ANSI/NSF International, Standard 61.

(1) ANSI/NSF Standard 61 Certification.

All interior surfaces or coatings shall consist of products which are certified by laboratories approved by ANSI and which comply with ANSI/NSF Standard 61 or other standards approved by the Executive Secretary. This requirement applies to any pipes and fittings, protective materials (e.g. paints, coatings, concrete admixtures, concrete release agents, concrete sealers), joining and sealing materials (e.g. adhesives, caulks, gaskets, primers and sealants) and mechanical devices (e.g. electrical wire, switches, sensors, valves, submersible pumps) which are located so as to come into contact with the drinking water.

(2) Curing Time and Volatile Organic Compounds.

If products which require a cure or set time are utilized in such a way as to come into contact with the drinking water, then water shall not be introduced into the vessel until any required curing time has passed. It shall be the responsibility of the water purveyor to assure that no tastes or odors, toxins or other compounds, which result in MCL exceedances, are imparted to the water as a result of tank repair.

R309-545-12. Steel Tanks.

(1) Paints.

Proper protection shall be given to all metal surfaces, both internal and external, by paints or other protective coatings. Internal coatings shall comply with ANSI/NSF Standard 61.

(2) Cathodic Protection.

If installed, internal cathodic protection shall be designed, installed and maintained by personnel trained in corrosion engineering.

R309-545-13. Tank Overflow.

All water storage structures shall be provided with an overflow which is discharged at an elevation between 12 and 24 inches above the ground surface with an appropriate air gap. The discharges shall not cause erosion.

(1) Diameter.

All overflow pipes shall be of sufficient capacity to permit waste of water in excess of the filling rate.

(2) Slope.

All overflow pipes shall Be sloped for complete drainage,

(3) Screen.

All overflow pipes shall be screened with No. 4 mesh non-corrodible screen installed at a location least susceptible to damage by vandalism,

(4) Visible Discharge.

All overflow pipes shall be located so that any discharge is visible,

(5) Cross Connections.

All overflow pipes shall not be connected to, or discharge into, any sanitary sewer system.

(6) Paint.

If an overflow pipe within a reservoir is painted or otherwise coated, such coating shall comply with ANSI/NSF Standard 61.

R309-545-14. Access Openings.

Drinking water storage structures shall be designed with reasonably convenient access to the interior for cleaning and maintenance.

(1) Height.

There shall be at least one opening above the water line which shall be framed at least four inches above the surface of the roof at the opening; or if on a buried structure, shall be elevated at least 18 inches above any earthen cover over the structure. The frame shall be securely fastened and sealed to the tank roof so as to prevent any liquid contaminant entering the tank. Concrete drinking water storage structures shall have raised curbs around access openings, formed and poured continuous with the pouring of the roof and sloped to direct water away from the frame.

(2) Shoebox Lid.

The frame of any access opening shall be provided with a close fitting solid shoebox type cover which extends down around the frame at least two inches and is furnished with a gasket(s) between the lid and frame,

(3) Locking Device.

The lid to any access opening shall have a locking device.

R309-545-15. Venting.

Drinking water storage structures shall be vented. Overflows shall not be considered as vents. Vents provided on drinking water storage reservoirs shall:

(1) Inverted Vent.

Be downturned or shielded to prevent the entrance of surface water and rainwater.

(2) Open Discharge.

On buried structures, have the discharge 24 to 36 inches above the earthen covering.

(3) Blockage.

Be located and sized so as to avoid blockage during winter conditions.

(4) Pests.

Exclude birds and animals.

(5) Dust.

Exclude insects and dust, as much as this function can be made compatible with effective venting.

(6) Screen.

Be fitted with No. 14 mesh or finer non-corrodible screen.

(7) Screen Protector.

Be fitted with additional heavy gage screen or substantial covering which will protect the No. 14 mesh screen against vandalism and, further, discourage purposeful attempts to contaminate the reservoir.

R309-545-16. Freezing Prevention.

All drinking water storage structures and their appurtenances, especially the riser pipes, overflows, and vents, shall be designed to prevent freezing which may interfere with proper functioning.

R309-545-17. Level Controls.

Adequate level control devices shall be provided to maintain water levels in storage structures.

R309-545-18. Security.

Locks on access manholes, and other necessary precautions shall be provided to prevent unauthorized entrance, vandalism, or sabotage.

R309-545-19. Safety.

(1) Utah OSHA.

The safety of employees shall be considered in the design of the storage structure. Ladders, ladder guards, platform railings, and safely located entrance hatches shall be provided where applicable. As a minimum, such matters shall conform to pertinent laws and regulations of the Utah Occupational Safety and Health Administration.

(2) Ladders.

Generally, ladders having an unbroken length in excess of 20 feet shall be provided with appropriate safety devices. This requirement shall apply both to interior and exterior reservoir ladders.

(3) Requirements for Elevated Tanks.

Elevated tanks shall have railings or handholds provided for transfer from the access tube to the water compartment.

R309-545-20. Disinfection.

Drinking water storage structures shall be disinfected before being put into service for the first time, and after being entered for cleaning, repair, or painting. The reservoir shall be cleaned of all refuse and shall then be washed with potable water prior to adding the disinfectant. AWWA Standard C652-02 [~~92~~] shall be followed for reservoir disinfection, with the exception there shall be no delivery of waters used in the disinfection process to the distribution system, unless specifically authorized, in writing, by the Executive Secretary.

Upon completing any of the three methods for storage tank chlorination, as outlined in AWWA C652-02 [~~92~~], the water system must properly dispose of residual super-chlorinated waters in the outlet pipes. Other super-chlorinated waters, which are not to be ultimately diluted and delivered into the distribution system, shall also be properly disposed.

Chlorinated water discharged from the storage tank shall be disposed of in an acceptable manner and in conformance with the rules of the Utah Water Quality Board (see R317 of the Utah Administrative Code).

R309-545-21. Incorporation by Reference.

The following list of Standards shall be considered as incorporated by reference in this specific rule. The most recent published copy of the referenced standard will apply in each case.

(1) AWWA Standards.

(a) C652-02 [~~92~~], Disinfection of Water Storage Reservoirs.

(b) D100-05 [~~96~~], Welded Steel Tanks for Water Storage.

(c) D101-53(R86), Inspecting and Repairing Steel Water Tanks, Standpipes, Reservoirs, and Elevated Tanks for Water Storage.

(d) D102-03 [~~97~~], Coating Steel Water-Storage Tanks.

(e) D103-97, Factory-Coated Bolted Steel Tanks for Water Storage.

(f) D104-01 [~~97~~], Automatically Controlled, Impressed-Current Cathodic Protection for the Interior of Steel Water Tanks.

(g) D110-04 [~~95~~], Wire-Wound Circular Prestressed-Concrete Water Tanks (including addendum D110a-96).

(h) D115-95, Circular Prestressed Concrete Water Tanks With Circumferential Tendons.

(i) D120-02 [~~84(R89)~~], Thermosetting Fiberglass-Reinforced Plastic Tanks.

(j) D130-02 [~~96~~], Flexible-Membrane-Lining and Floating-Cover Materials for Potable-Water Storage.

(2) NSF International Standards.

(a) NSF 60, Drinking Water Treatment Chemicals - Health Effects.

(b) NSF 61, Drinking Water System Components - Health Effects.

(3) Utah OSHA.

Applicable standards of the Utah Occupational Safety and Health Administration are hereby incorporated by reference.

R309-545-22. Operation and Maintenance of Storage Tanks.

(1) Inspection and Cleaning.

Tanks which are entered for inspection and cleaning shall be disinfected in accordance with AWWA Standard C652-02 [~~92~~] prior to being returned to service. When diver(s) enter storage tanks that have not been drained for inspection purposes, they shall comply with section five of the above standard unless the tank is constructed of steel, in which case they shall comply additionally with AWWA Standard D101-53(R86).

(2) Recoating or Repairing.

Any substance used to recoat or repair the interior of drinking water storage tank shall be certified to conform with ANSI/NSF Standard 61. If the tank is not drained for recoating or repairing, any substance or material used to repair interior coatings or cracks shall be suitable for underwater application, as indicated by the manufacturer, as well as comply with both ANSI/NSF Standards 60 and 61.

(3) Seasonal Use.

Water storage tanks which are operated seasonally shall be flushed and disinfected in accordance with AWWA Standard C652-02 [~~92~~] prior to each season's use. Certification of proper disinfection, as evidenced by at least one satisfactory bacteriologic sample, shall be obtained by the system management and kept on file for inspection by personnel of the Division. During the non-use period, care shall be taken to see that openings to the water storage tank (those which are normally closed and sealed during normal use) are closed and secured.

KEY: drinking water, storage tanks, access, overflow and drains
Date of Enactment or Last Substantive Amendment: March 8, 2006
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

AGENDA ITEM 7

Final Adoption of the Ground Water Development, Well Grout Rules - R309-515-6 (3), (6) and (12) – Michael Georgeson

Comments Received Concerning Amendments to Portions of R309-515 and Request for the Board to Set an Effective Date

Comments received prior to publication in the Utah Bulletin have been addressed and a letter (see attached copy) has been sent to those individuals.

W. Hunter Finch, regulatory law analyst for the Governor's Office of Planning & Budget, commented by e-mail concerning an incorrect reference citation. His comments are found on following pages along with appropriate pages from the Utah Bulletin with the error highlighted and correction indicated.

Staff reviewed the comments made prior to publication and prepared changes prior to the July 11, 2008 meeting of the Board in Cedar City where authorization was given to file the amendments with the Division of Administrative Rules.

STAFF RECOMMENDATION:

Board establish a date that the amended portions of rule will become effective (on any working day following today or before Saturday, November 29, 2008), and authorize staff to file with the Division of Administrative Rules a Notice of Effective Date and also authorize staff to file with the Division of Administrative Rules the indicated correction shown in the enclosed copies of rule as a Notice of Non-Substantive Rule Change.

State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

Richard W. Sprott
Executive Director

DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

August 13, 2008

Board of Directors
Utah Ground Water Association
650 East 4500 South, Ste 340
Murray, Utah 84107

Dear Board Members:

Subject: Proposed Rule Changes

We responded to your comments about the Division's proposed rule changes in our letter dated July 3, 2008. We revised the proposed rule changes for presentation to the Drinking Water Board at its July 11, 2008 meeting. The Board accepted the revisions and authorized the Division to proceed with the official rulemaking process. Notices of these changes were published in the Utah State Bulletin, August 1, 2008 edition. You may comment officially, in writing, on the proposed rule revisions until 5:00pm on September 2, 2008. Your comments should be addressed to the Division of Drinking Water, 150 North 1950 West, Salt Lake City, UT 84116-3085, by fax to 801-536-4211, or by E-mail to bbirkes@utah.gov.

The full text of the changes is available at the Division of Administrative Rules website www.rules.utah.gov/publicat/bull_pdf/2008/b20080801.pdf.

The changes we made to accommodate your comments follow:

Comment 1: Temporary Casing
You asked what was meant by "temporary casing". We added the definition as shown below:

(C) All temporary construction casings shall [~~should~~] be removed prior to or during the well sealing operation. Any exceptions shall be approved by the State Engineer and evidence of approval submitted to the Executive Secretary (see R655-4-9.4.3.1 for conditions surrounding leaving temporary surface casing in place. A temporary construction casing is a casing not intended to be part of the permanent well).[~~but shall be withdrawn at least five feet during the grouting operation to ensure grout contact with the native formations.~~]

150 North 1950 West • Salt Lake City, UT
Mailing Address: P.O. Box 144830 • Salt Lake City, UT 84114-4830
Telephone (801) 536-4200 • Fax (801-536-4211 • T.D.D. (801) 536-4414
www.deq.utah.gov

Comment 2: Seals
You expressed concern with the difficulty of scheduling a grout witness with Division staff We asked the Division staff and the district engineers about the issues you raised and uniformly they said they were not aware of the problems you listed. Almost uniformly, they said that they did their best to accommodate the driller's schedule including working outside regularly scheduled times. We have the same constraints that any business has of regular office hours and now, with Governor Huntsman's revision of our hours we are open two more hours each day, but closed on Friday. The Division is reviewing the grout witness effort and will likely propose changes to it at a future time.

Comment 3: Pitless Adapters
To address your concerns relative to pitless units and adapters the proposed language was changed to allow torch cut holes as follows:

If the excavation surrounding the well casing allowing installation of the pitless unit compromises the surface seal the competency of the surface seal shall be restored. Torch cut holes in the well casing shall be to neat lines closely following the outline of the pitless adapter and completely filled with a competent weld with burrs and fins removed prior to the installation of the pitless unit and adapter.

The concerns expressed relative to backfilling the excavation required to install a pitless unit on a well casing was accommodated by changing the proposed revised rule:

Where an annular opening greater than six inches is available a [~~clay~~] seal of [~~clean local clay mixed with at least ten percent~~] swelling bentonite meeting the requirements of R655-4-9.4.2 may be used when approved by the Executive Secretary.

In addition, we will require that when a pitless unit is to be installed on a well the gout seal will be required to extend from 10 feet to 110 feet instead of from the surface to 100 feet as is now the case.

We provided the Drinking Water Board with a copy of your letter prior to its July 11, 2008 meeting and addressed your expressed concerns as shown above to its satisfaction. After which the Board authorized the Division to begin the rule-making process.

Sincerely,

Michael B. Georgeson, P.E.
Environmental Engineer

cc: Individual Board Members, Utah Ground Water Association
Jim Goddard, Division of Water Rights

F:\wp\Rule Revisions\Second response to grdwtr board.doc

From: Bill Birkes
To: Linda Matulich
Date: 8/20/2008 12:22 PM
Subject: Fwd: Re: Rule Correction: DAR No. 31710

>>> Hunter Finch 8/14/2008 5:46 PM >>>
Thanks, Bill.

Hunter

>>> Bill Birkes 08/14/08 3:49 PM >>>
Hunter: You are correct! The reference should be to R309-515-6(6)(i)(ii) which is titled "Grouting Materials."

It is our intent to ask the Drinking Water Board at their September 10, 2008 meeting to authorize staff to file an effective date and I will make sure to also ask for authorization to file a Non-Substantive Rule Change at the same time.

Thank You.

William B. Birkes, P.E.
Utah Division of Drinking Water
P.O. Box 144830
Salt Lake City, Utah 84114-4830
Voice: 801-536-4201
Fax: 801-536-4211
E-mail: bbirkes@utah.gov
Visit our Website: http://drinkingwater.utah.gov

>>> Hunter Finch 8/14/2008 8:18 AM >>>
Bill,

It appears a citation may be incorrect in your proposed DAR No. 31710 rule change for R309-515-6 in the following area:

R309-515-6(6)(i) wherein the citation "R309-515-6(i)(ii)" is incomplete. It appears the correct citation should be R309-515-6(6)(i)(ii).

Please let me know if my finding on this item is inaccurate. And, if a correction does need to take place, please apprise me of efforts to file a Non-Substantive Rule Change request.

Thanks,
Hunter

W. Hunter Finch, M.Ed., MSW, LCSW
Budget and Policy Analyst
Regulatory Law Analyst

Governor's Office of Planning & Budget
State Capitol Complex
East Office Building, Suite E210
Salt Lake City, Utah 84114-2210
Phone# 801-538-1553
Fax# 801-538-1547
hfinch@utah.gov

KEY: licensing, security guards, armored car security officers, armored car company
Date of Enactment or Last Substantive Amendment: 2008
Authorizing, and Implemented or Interpreted Law: 58-1-106(1)(a); 58-1-202(1)(a); 58-63-101

Environmental Quality, Drinking Water
R309-515-6
Ground Water - Wells

NOTICE OF PROPOSED RULE
(Amendment)
DAR FILE NO.: 31709
FILED: 07/15/2008, 14:36

RULE ANALYSIS

PURPOSE OF THE RULE OR REASON FOR THE CHANGE: The changes are necessary to eliminate a compromised well seal caused by installing a pitless unit on a well casing; and replace no longer existing standards with a current industry-accepted one.

SUMMARY OF THE RULE OR CHANGE: The proposed amendments: require the replacement of a well seal disturbed during excavation to install a pitless adapter; require the well casing to be completely sealed after installing a pitless adapter; and citing a standard of manufacturing for pitless adapters.

STATE STATUTORY OR CONSTITUTIONAL AUTHORIZATION FOR THIS RULE: Section 19-4-104

ANTICIPATED COST OR SAVINGS TO:
❖ THE STATE BUDGET: None--This amendment provides more consistency between this rule and the State Engineer's rules for well drillers, but does not add any inspection or monitoring not already budgeted.
❖ LOCAL GOVERNMENTS: Little to none--The well drillers already generally meet these requirements. The replacement standard has been accepted by the industry for over ten years.
❖ SMALL BUSINESSES AND PERSONS OTHER THAN BUSINESSES: Little to none--The well drillers already generally meet these requirements. The replacement standard has been accepted by the industry for over ten years.

COMPLIANCE COSTS FOR AFFECTED PERSONS: There may be marginal costs associated with replacing the well seal.

COMMENTS BY THE DEPARTMENT HEAD ON THE FISCAL IMPACT THE RULE MAY HAVE ON BUSINESSES: The department agrees that the proposed changed to this rule will have little to no detrimental impact on existing water systems nor on new public water systems. Richard Sprott, Executive Director

THE FULL TEXT OF THIS RULE MAY BE INSPECTED, DURING REGULAR BUSINESS HOURS, AT:
ENVIRONMENTAL QUALITY
DRINKING WATER
150 N 1950 W
SALT LAKE CITY UT 84116-3085, or
at the Division of Administrative Rules.

DIRECT QUESTIONS REGARDING THIS RULE TO:
Bill Birkes at the above address, by phone at 801-536-4201, by FAX at 801-536-4211, or by Internet E-mail at bbirkes@utah.gov

INTERESTED PERSONS MAY PRESENT THEIR VIEWS ON THIS RULE BY SUBMITTING WRITTEN COMMENTS TO THE ADDRESS ABOVE NO LATER THAN 5:00 PM on 09/02/2008.

THIS RULE MAY BECOME EFFECTIVE ON: 09/09/2008

AUTHORIZED BY: Ken Bousfield, Director

R309. Environmental Quality, Drinking Water.
R309-515. Facility Design and Operation: Source Development.
R309-515-6. Ground Water - Wells.

.....

(12) Well Equipping.
(a) Naturally Flowing Wells.
Naturally flowing wells shall:
(i) have the discharge controlled by valves,
(ii) be provided with permanent casing and sealed by grout,
(iii) if erosion of the confining bed adjacent to the well appears likely, special protective construction may be required by the Division.
(b) Line Shaft Pumps.
Wells equipped with line shaft pumps shall:
(i) have the casing firmly connected to the pump structure or have the casing inserted into the recess extending at least 0.5 inches into the pump base,
(ii) have the pump foundation and base designed to prevent fluids from coming into contact with joints between the pump base and the casing,
(iii) be designed such that the intake of the well pump is at least ten feet below the maximum anticipated drawdown elevation,
(iv) avoid the use of oil lubrication for pumps with intake screens set at depths less than 400 feet (see R309-105-10(7) and/or R309-515-8(2)for additional requirements of lubricants).
(c) Submersible Pumps.
Where a submersible pump is used:
(i) The top of the casing shall be effectively sealed against the entrance of water under all conditions of vibration or movement of conductors or cables.
(ii) The electrical cable shall be firmly attached to the riser pipe at 20 foot intervals or less.
(iv) The intake of the well pump must be at least ten feet below the maximum anticipated drawdown elevation.
(d) Pitless Well Units and Adapters.

If the excavation surrounding the well casing allowing installation of the pitless unit compromises the surface seal the competency of the surface seal shall be restored. Torch cut holes in the well casing shall be to neat lines closely following the outline of the pitless adapter and completely filled with a competent weld with burrs and fins removed prior to the installation of the pitless unit and adapter.

Pitless well units and adapters shall:

(i) not be used unless the specific application has been approved by the Executive Secretary,

(ii) be used to make a conection to a water well casing that is made below the ground. A below the ground connection shall not be submerged in water during installation,

(iii) terminate at least 18 inches above final ground elevation or three feet above the highest known flood elevation whichever is greater,

(iv)[~~(iii)~~] pitless adapters or pitless units to be used shall contain a label or imprint indicating compliance with the Water Systems Council Pitless Adapter Standard (PAS-97)[~~be approved by NSF International or the Pitless Adapter Association or other appropriate Review Authority~~],

(v)[~~(iv)~~] have suitable access to the interior of the casing in order to disinfect the well,

(vi)[~~(v)~~] have a suitable sanitary seal or cover at the upper terminal of the casing that will prevent the entrance of any fluids or contamination, especially at the connection point of the electrical cables,

(vii)[~~(vi)~~] have suitable access so that measurements of static and pumped water levels in the well can be obtained,

(viii)[~~(vii)~~] allow at least one check valve within the well casing,

(ix) [~~(viii)~~] be furnished with a cover that is lockable or otherwise protected against vandalism or sabotage,

(x)[~~(ix)~~] be shop-fabricated from the point of connection with the well casing to the unit cap or cover,

(xi)[~~(x)~~] be of watertight construction throughout,

(xii)[~~(xi)~~] be constructed of materials at least equivalent to and having wall thickness compatible to the casing,

(xiii)[~~(xii)~~] have field connection to the lateral discharge from the pitless unit of threaded, flanged or mechanical joint connection,

(xiv)[~~(xiii)~~] be threaded or welded to the well casing. If the connection to the casing is by field weld, the shop assembled unit must be designed specifically for field welding to the casing. The only field welding permitted on the pitless unit will be that needed to connect a pitless unit to the casing, and

(xv)[~~(xiv)~~] have an inside diameter as great as that of the well casing, up to and including casing diameters of 12 inches, to facilitate work and repair on the well, pump, or well screen.

(e) Well Discharge Piping.

The discharge piping shall:

(i) be designed so that the friction loss will be low,

(ii) have control valves and appurtenances located above the pump house floor when an above-ground discharge is provided,

(iii) be protected against the entrance of contamination,

(iv) be equipped with (in order of placement from the well head) a smooth nosed sampling tap, a check valve, a pressure gauge, a means of measuring flow and a shutoff valve,

(v) where a well pumps directly into a distribution system, be equipped with an air release vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a down-turned position at least six inches above the floor and covered with a No. 14 mesh corrosion resistant screen. An exception to this requirement will be allowed provided specific proposed well head valve and piping design includes provisions for pumping to waste all trapped air before water is introduced into the distribution system,

(vi) have all exposed piping valves and appurtenances protected against physical damage and freezing,

(vii) be properly anchored to prevent movement, and

(f) Water Level Measurement.

(i) Provisions shall be made to permit periodic measurement of water levels in the completed well.

(ii) Where permanent water level measuring equipment is installed it shall be made using corrosion resistant materials attached firmly to the drop pipe or pump column and installed in such a manner as to prevent entrance of foreign materials.

(g) Observation Wells.

Observation wells shall be:

(i) constructed in accordance with the requirements for permanent wells if they are to remain in service after completion of a water supply well, and

(ii) protected at the upper terminal to preclude entrance of foreign materials.

(h) Electrical Protection.

Sufficient electrical controls shall be placed on all pump motors to eliminate electrical problems due to phase shifts, surges, lightning, etc.

(13) Well House Construction.

The use of a well house is strongly recommended, particularly in installations utilizing above ground motors.

In addition to applicable provisions of R309-540, well pump houses shall conform to the following:

(a) Casing Projection Above Floor.

The permanent casing for all ground water wells shall project at least 12 inches above the pump house floor or concrete apron surface and at least 18 inches above the final ground surface. However, casings terminated in underground vaults may be permitted if the vault is provided with a drain to daylight sized to handle in excess of the well flow and surface runoff is directed away from the vault access.

(b) Floor Drain.

Where a well house is constructed the floor surface shall be at least six inches above the final ground elevation and shall be sloped to provide drainage. A "drain-to-daylight" shall be provided unless highly impractical.

(c) Earth Berm.

Sites subject to flooding shall be provided with an earth berm terminating at an elevation at least two feet above the highest known flood elevation or other suitable protection as determined by the Executive Secretary.

(d) Well Casing Termination at Flood Sites.

The top of the well casing at sites subject to flooding shall terminate at least 3 feet above the 100 year flood level or the highest known flood elevation, whichever is higher (refer to R309-515-6(6)(b)(vi)).

(e) Miscellaneous.

The well house shall be ventilated, heated and lighted in such a manner as to assure adequate protection of the equipment (refer to R309-540-5(2) (a) through (h)

(f) Fencing.

Where necessary to protect the quality of the well water the Executive Secretary may require that certain wells be fenced in a manner similar to fencing required around spring areas.

(g) Access.

An access shall be provided either through the well house roof or sidewalls in the event the pump must be pulled for replacement or servicing the well.

KEY: drinking water, source development, source maintenance
Date of Enactment or Last Substantive Amendment: [~~April 21, 2004~~]2008
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

Environmental Quality, Drinking Water
R309-515-6
Ground Water - Wells

NOTICE OF PROPOSED RULE
(Amendment)
DAR FILE NO.: 31710
FILED: 07/15/2008, 14:39

RULE ANALYSIS

PURPOSE OF THE RULE OR REASON FOR THE CHANGE: Three reasons for the changes are: 1) to maintain consistency with the State Engineer's well drilling rules; 2) to eliminate inadvertent contamination of ground water; and 3) to remove redundant language.

SUMMARY OF THE RULE OR CHANGE: The changes: 1) maintain consistency with the State Engineer's well drilling rules; 2) eliminate inadvertent contamination of ground water; and 3) remove redundant language.

STATE STATUTORY OR CONSTITUTIONAL AUTHORIZATION FOR THIS RULE: Section 19-4-104

ANTICIPATED COST OR SAVINGS TO:
- THE STATE BUDGET: None--This amendment provides more consistency between this rule and the State Engineer's rules for well drillers, but does not add any inspection or monitoring not already budgeted.
- LOCAL GOVERNMENTS: Little to none--The well drillers already generally meet these requirements.
- SMALL BUSINESSES AND PERSONS OTHER THAN BUSINESSES: Little to none--The well drillers already generally meet these requirements.

COMPLIANCE COSTS FOR AFFECTED PERSONS: Little to none since these proposals reflect current practice, however, in the rare instance of needing to seal a large annular space more select material will be required instead of using local materials.

COMMENTS BY THE DEPARTMENT HEAD ON THE FISCAL IMPACT THE RULE MAY HAVE ON BUSINESSES: The department agrees that the proposed changes to this rule will have little to no detrimental impact on existing water systems nor on new public water systems. Richard Sprott, Executive Director

THE FULL TEXT OF THIS RULE MAY BE INSPECTED, DURING REGULAR BUSINESS HOURS, AT:
ENVIRONMENTAL QUALITY
DRINKING WATER
150 N 1950 W
SALT LAKE CITY UT 84116-3085, or
at the Division of Administrative Rules.

DIRECT QUESTIONS REGARDING THIS RULE TO:
Bill Birkes at the above address, by phone at 801-536-4201, by FAX at 801-536-4211, or by Internet E-mail at bbirkes@utah.gov

INTERESTED PERSONS MAY PRESENT THEIR VIEWS ON THIS RULE BY SUBMITTING WRITTEN COMMENTS TO THE ADDRESS ABOVE NO LATER THAN 5:00 PM on 09/02/2008.

THIS RULE MAY BECOME EFFECTIVE ON: 09/09/2008

AUTHORIZED BY: Ken Bousfield, Director

R309. Environmental Quality, Drinking Water.
R309-515. Facility Design and Operation: Source Development.
R309-515-6. Ground Water - Wells.

(1) Required Treatment.

If properly developed, water from wells may be suitable for culinary use without treatment. A determination as to whether treatment may be required can only be made after the source has been developed and evaluated.

(2) Standby Power.

Water suppliers, particularly community water suppliers, should assess the capability of their system in the event of a power outage. If gravity fed spring sources are not available, one or more of the system's well sources should be equipped for operation during power outages. In this event:

(a) To ensure continuous service when the primary power has been interrupted, a power supply should be provided through connection to at least two independent public power sources, or portable or in-place auxiliary power available as an alternative; and

(b) When automatic pre-lubrication of pump bearings is necessary, and an auxiliary power supply is provided, the pre-lubrication line should be provided with a valved by-pass around the automatic control, or the automatic control shall be wired to the emergency power source.

(3) The Utah Division of Water Rights.

The Utah Division of Water Rights (State Engineer's Office) regulates the drilling of water wells. Before the drilling of a well commences, the well driller must receive a start card from the State Engineer's Office. For public drinking water supply wells the rules of R655-4 still apply and must be followed in addition to these rules.

(4) Source Protection.

Public drinking water systems are responsible for protecting their sources from contamination. The selection of a well location shall only be made after consideration of the requirements of R309-600. Sources shall be located in an area which will minimize threats from existing or potential sources of pollution.

If certain precautions are taken, sewer lines may be permitted within a public drinking water system's source protection zones at the discretion of the Executive Secretary. When sewer lines are permitted in protection zones both sewer lines and manholes shall be specially constructed as follows:

(a) sewer lines shall be ductile iron pipe with mechanical joints or fusion welded high density polyethylene plastic pipe (solvent welded joints shall not be accepted);

(b) lateral to main connection shall be shop fabricated or saddled with a mechanical clamping watertight device designed for the specific pipe;

(c) the sewer pipe to manhole connections shall made using a shop fabricated sewer pipe seal ring cast into the manhole base (a mechanical joint shall be installed within 12 inches of the manhole base on each line entering the manhole, regardless of the pipe material);

(d) the sewer pipe shall be laid with no greater than 2 percent deflection at any joint;

(e) backfill shall be compacted to not less than 95 percent of maximum laboratory density as determined in accordance with ASTM Standard D-690;

(f) sewer manholes shall meet the following requirements:

(i) the manhole base and walls, up to a point at least 12 inches above the top of the upper most sewer pipe entering the manhole, shall be shop fabricated in a single concrete pour.

(ii) the manholes shall be constructed of reinforced concrete.

(iii) all sewer lines and manholes shall be air pressure tested after installation.

(5) Outline of Well Approval Process.

(a) Well drilling shall not commence until both of the following items are submitted and receive a favorable review:

(i) a Preliminary Evaluation Report on source protection issues as required by R309-600-13, and

(ii) engineering plans and specifications governing the well drilling, prepared by a licensed well driller holding a current Utah Well Drillers Permit if previously authorized by the Executive Secretary or prepared, signed and stamped by a licensed professional engineer or professional geologist licensed to practice in Utah.

(b) Grouting Inspection During Well Construction.

An engineer from the Division, or the appropriate district engineer of the Department of Environmental Quality, an authorized representative of the State Engineer's Office, or an individual authorized by the Executive Secretary shall be contacted at least three days before the anticipated beginning of the well grouting procedure (see R309-515-6(6)(i)). The well grouting procedure shall be witnessed by one of these individuals or their designee.

(c) After completion of the well drilling the following information shall be submitted and receive a favorable review before water from the well can be introduced into a public water system:

(i) a copy of the "Report of Well Driller" as required by the State Engineer's Office which is complete in all aspects and has been stamped as received by the same;

(ii) a copy of the letter from the authorized individual described in R309-515-6(5)(b) above, indicating inspection and confirmation that the well was grouted in accordance with the well drilling specifications and the requirements of this rule;

(iii) a copy of the pump test including the yield vs. drawdown test as described in R309-515-6(10)(b) along with comments / interpretation by a licensed professional engineer or licensed professional geologist of the graphic drawdown information required by R309-515-6(b)(vi)(E);

(iv) a copy of the chemical analyses required by R309-515-4(5);

(v) documentation indicating that the water system owner has a right to divert water for domestic or municipal purposes from the well source;

(vi) a copy of complete plans and specifications prepared, signed and stamped by a licensed professional engineer covering the well housing, equipment and diversion piping necessary to introduce water from the well into the distribution system; and

(vii) a bacteriological analysis of water obtained from the well after installation of permanent equipment, disinfection and flushing.

(d) An Operation Permit shall be obtained in accordance with R309-500-9 before any water from the well is introduced into a public water system.

(6) Well Materials, Design and Construction.

(a) ANSI/NSF Standards 60 and 61 Certification.

All interior surfaces must consist of products complying with ANSI/NSF Standard 61. This requirement applies to drop pipes, well screens, coatings, adhesives, solders, fluxes, pumps, switches, electrical wire, sensors, and all other equipment or surfaces which may contact the drinking water.

All substances introduced into the well during construction or development shall be certified to comply with ANSI/NSF Standard 60. This requirement applies to drilling fluids (biocides, clay thinners, defoamers, foamers, loss circulation materials, lubricants, oxygen scavengers, viscosifiers, weighting agents) and regenerants. This requirement also applies to well grouting and sealing materials which may come in direct contact with the drinking water.

(b) Permanent Steel Casing Pipe shall:

(i) be new single steel casing pipe meeting AWWA Standard A-100, ASTM or API specifications and having a minimum weight and thickness as given in Table 1 found in R655-4-9.4 of the Utah Administrative Code (Administrative Rules for Water Well Drillers, adopted January 1, 2001, Division of Water Rights);

(ii) have additional thickness and weight if minimum thickness is not considered sufficient to assure reasonable life expectancy of the well;

(iii) be capable of withstanding forces to which it is subjected;

(iv) be equipped with a drive shoe when driven;

(v) have full circumferential welds or threaded coupling joints; and

(vi) project at least 18 inches above the anticipated final ground surface and at least 12 inches above the anticipated pump house floor level. At sites subject to flooding the top of the well casing shall terminate at least three feet above the 100 year flood level or the highest known flood elevation, whichever is higher.

(c) Non-Ferrous Casing Material.

The use of any non-ferrous material for a well casing shall receive prior approval of the Executive Secretary based on the ability of the material to perform its desired function. Thermoplastic water well casing pipe shall meet ANSI/ASTM Standard F480-76 and shall bear the logo NSF-wc indicating compliance with NSF Standard 14 for use as well casing.

(d) Disposal of Cuttings.

Cuttings and waste from well drilling operations shall not be discharged into a waterway, lake or reservoir. The rules of the Utah Division of Water Quality must be observed with respect to these discharges.

(e) Packers.

Packers, if used, shall be of material that will not impart taste, odor, toxic substances or bacterial contamination to the well water. Lead, or partial lead packers are specifically prohibited.

(f) Screens.

The use of well screens is recommended where appropriate and, if used, they shall:

(i) be constructed of material resistant to damage by chemical action of groundwater or cleaning operations;

(ii) have size of openings based on sieve analysis of formations or gravel pack materials;

(iii) have sufficient diameter to provide adequate specific capacity and low aperture entrance velocities;

(iv) be installed so that the operating water level remains above the screen under all pumping conditions; and

(v) be provided with a bottom plate or washdown bottom fitting of the same material as the screen.

(g) Plumbness and Alignment Requirements.

Every well shall be tested for plumbness and vertical alignment in accordance with AWWA Standard A100. Plans and specifications submitted for review shall:

(i) have the test method and allowable tolerances clearly stated in the specifications. and

(ii) clearly indicate any options the design engineer may have if the well fails to meet the requirements. Generally wells may be accepted if the misalignment does not interfere with the installation or operation of the pump or uniform placement of grout.

(h) Casing Perforations.

The placement of perforations in the well casing shall:

(i) be so located to permit as far as practical the uniform collection of water around the circumference of the well casing, and

(ii) be of dimensions and size to restrain the water bearing soils from entrance into the well.

(i) Grouting Techniques and Requirements.

For all public drinking water wells the annulus between the outermost well casing and the borehole wall[~~All permanent well casing for public drinking water wells~~] shall be grouted to a depth of at least 100 feet below the ground surface unless an "exception" is issued by the Executive Secretary (see R309-500-4(1)). If more than one casing is used, including a conductor casing, the annulus between the outermost casing and the next inner casing shall be sealed with grout (meeting the grouting materials requirements of R309-515-6(i)(ii) herein) or with a water tight steel ring having a thickness equal to that of the permanent well casing and continuously welded to both casings.

If a well is to be considered in a protected aquifer the grout seal shall extend from the ground surface down to at least 100 feet below the surface, and through the protective layer, as described in R309-600-6(1)(x)[~~(v)~~] (see also R309-515[~~-151~~]-6(6)(i)(iii)(D) below).

The following applies to all drinking water wells:

(i) Consideration During Well Construction.

(A) Sufficient annular opening shall be provided to permit a minimum of two inches of grout between the outermost permanent casing and the drilled hole, taking into consideration any joint couplings.[~~- If a carrier casing is left in place, the minimum clearances above shall pertain to both annular openings (between casings and between carrier casing and the drilled hole), the carrier casing shall be adequately perforated so as to ensure grout contact with the native formations, and the carrier casing shall be withdrawn at least five feet during grouting operations.~~]

(B) Additional information is available from the Division for recommended construction methods for grout placement.

(C) The casing(s) must be provided with sufficient guides welded to the casing to permit unobstructed flow and uniform thickness of grout.

(ii) Grouting Materials.

(A) Neat Cement Grout.

Cement, conforming to ASTM Standard C150, and water, with no more than six gallons of water per sack of cement, shall be used for two inch openings. Additives may be used to increase fluidity subject to approval by the Executive Secretary.

(B) Concrete Grout.

Equal parts of cement conforming to ASTM Standard C150, and sand, with not more than six gallons of water per sack of cement may be used for openings larger than two inches.

(C) Clay Seal.

Where an annular opening greater than six inches is available a [~~clay~~]seal of [~~clean local clay mixed with at least ten percent~~]swelling bentonite meeting the requirements of R655-4-9.4.2 may be used when approved by the Executive Secretary.

(iii) Application.

(A) When the annular opening is less than four inches, grout shall be installed under pressure, by means of a positive displacement grout pump, from the bottom of the annular opening to be filled.

(B) When the annular opening is four or more inches and 100 feet or less in depth, and concrete grout is used, it may be placed by gravity through a grout pipe installed to the bottom of the annular opening in one continuous operation until the annular opening is filled.

(C) All temporary construction casings shall[~~should~~] be removed prior to or during the well sealing operation. Any exceptions shall be approved by the State Engineer and evidence of approval submitted to the Executive Secretary (see R655-4-9.4.3.1 for conditions surrounding leaving temporary surface casing in place. A temporary construction casing is a casing not intended to be part of the permanent well.[~~but shall be withdrawn at least five feet during the grouting operation to ensure grout contact with the native formations.~~]

(D) When a "well in a protected aquifer" classification is desired, the grout seal shall extend from the ground surface down to at least 100 feet below the surface, and through the protective clay layer (see R309-600-6(1)(x)[~~(v)~~]).[~~- If the clay layer starts below 100 feet, grout shall extend from the ground surface to a depth of at least 100 feet, grout or native fill may be utilized from there to the top of the clay layer, and then grout placed completely through the protective clay layer. If the clay layer starts and ends above 100 feet, grout shall extend from the ground surface down to and completely through the protective clay layer.~~]

(E) After cement grouting is applied, work on the well shall be discontinued until the cement or concrete grout has properly set; usually a period of 72 hours.

(j) Water Entered Into Well During Construction.

Any water entering a well during construction shall not be contaminated and should be obtained from a chlorinated municipal system. Where this is not possible the water must be dosed to give a 100 mg/l free chlorine residual. Refer also to the administrative rules of the Division of Water Rights in this regard.

(k) Gravel Pack Wells.

The following shall apply to gravel packed wells:

(i) the gravel pack material is to be of well rounded particles, 95 percent siliceous material, that are smooth and uniform, free of foreign material, properly sized, washed and then disinfected immediately prior to or during placement,

(ii) the gravel pack is placed in one uniform continuous operation,

(iii) refill pipes, when used, are Schedule 40 steel pipe incorporated within the pump foundation and terminated with screwed or welded caps at least 12 inches above the pump house floor or concrete apron,

(iv) refill pipes located in the grouted annular opening be surrounded by a minimum of 1.5 inches of grout,

(v) protection provided to prevent leakage of grout into the gravel pack or screen, and

(vi) any casings not withdrawn entirely meet requirements of R309-515-6(6)(b) or R309-515-6(6)(c).

(7) Well Development.

(a) Every well shall be developed to remove the native silts and clays, drilling mud or finer fraction of the gravel pack.

(b) Development should continue until the maximum specific capacity is obtained from the completed well.

(c) Where chemical conditioning is required, the specifications shall include provisions for the method, equipment, chemicals, testing for residual chemicals, and disposal of waste and inhibitors.

(d) Where blasting procedures may be used the specifications shall include the provisions for blasting and cleaning. Special attention shall be given to assure that the grouting and casing are not damaged by the blasting.

.....

KEY: drinking water, source development, source maintenance
Date of Enactment or Last Substantive Amendment: [~~April 21, 2004~~]2008
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

Insurance, Administration
R590-102
Insurance Department Fee Payment Rule

NOTICE OF PROPOSED RULE
(Amendment)
DAR FILE NO.: 31652
FILED: 07/02/2008, 14:28

RULE ANALYSIS

PURPOSE OF THE RULE OR REASON FOR THE CHANGE: This rule is required to note changes in the department's schedule of fees, which are approved by the legislature, and to establish fee deadlines. The changes noted in this rule were made by the 2008 Legislative Session in the appropriations bill, H.B. 2. (DAR NOTE: H.B. 2 (2008) is found at Chapter 392, Laws of Utah 2008, and was effective 07/01/2008.)

SUMMARY OF THE RULE OR CHANGE: Most of the changes to this rule are related to formatting and grammar. Section R590-102-9 was added to address professional employer organization fees (PEO) as required by H.B. 159 which was passed this year. Sections R590-102-12 and R590-102-13 were moved from Section R590-102-11 into their own sections. Section R590-102-16 addressed fingerprint fees and the annual assessment for the Title Recovery, Education, and Research Fund as required in H.B. 466 of the same name that was passed this year. Section R590-102-17 addressed fee for accessing public rate and form filings. (DAR NOTES: H.B. 159 (2008) is found at Chapter 318, Laws of Utah 2008, and was effective 05/05/2008. H.B. 466 (2008) is found at Chapter 220, Laws of Utah 2008, and was effective 07/01/2008.)

STATE STATUTORY OR CONSTITUTIONAL AUTHORIZATION FOR THIS RULE: Section 31A-3-103

ANTICIPATED COST OR SAVINGS TO:

❖ THE STATE BUDGET: The changes to this rule will not require the department to add or reduce personnel, however, there should be minimal impact on the state budget.

❖ LOCAL GOVERNMENTS: The changes to this rule will have no fiscal impact on local governments since it deals solely with the relationship between the department and its licensees.

❖ SMALL BUSINESSES AND PERSONS OTHER THAN BUSINESSES: This rule has no fiscal impact because it merely publishes the schedule of fees approved by the legislature in the appropriations bill, H.B. 2 (2008).

COMPLIANCE COSTS FOR AFFECTED PERSONS: This rule has no fiscal impact because it merely publishes the schedule of fees approved by the legislature in the appropriations bill, H.B. 2 (2008), passed this year.

COMMENTS BY THE DEPARTMENT HEAD ON THE FISCAL IMPACT THE RULE MAY HAVE ON BUSINESSES: This rule has no fiscal impact because it merely publishes the schedule of fees approved by the legislature in the appropriations bill, H.B. 2 (2008). D. Kent Michie, Commissioner

THE FULL TEXT OF THIS RULE MAY BE INSPECTED, DURING REGULAR BUSINESS HOURS, AT:

INSURANCE
ADMINISTRATION
Room 3110 STATE OFFICE BLDG
450 N MAIN ST
SALT LAKE CITY UT 84114-1201, or
at the Division of Administrative Rules.

DIRECT QUESTIONS REGARDING THIS RULE TO:
Jilene Whitby at the above address, by phone at 801-538-3803, by FAX at 801-538-3829, or by Internet E-mail at jwhitby@utah.gov

INTERESTED PERSONS MAY PRESENT THEIR VIEWS ON THIS RULE BY SUBMITTING WRITTEN COMMENTS TO THE ADDRESS ABOVE NO LATER THAN 5:00 PM on 09/02/2008.

THIS RULE MAY BECOME EFFECTIVE ON: 09/09/2008

AUTHORIZED BY: Jilene Whitby, Information Specialist

R590. Insurance, Administration.
R590-102. Insurance Department Fee Payment Rule.
R590-102-1. Authority.

This rule is adopted pursuant to Subsections 31A-3-103[~~(2)~~](4) and [~~(4)~~](5) which require the commissioner to publish the schedule of fees approved by the [~~Legislature~~]legislature and to establish deadlines for payment of each of the various fees.

R590-102-2. Purpose and Scope.

(1) The purposes of this rule [~~is~~]are to:

(a) publish the schedule of fees approved by the legislature[~~,~~];[~~to~~]

R309. Environmental Quality, Drinking Water.
R309-545. Facility Design and Operation: Drinking Water Storage Tanks.
R309-545-1. Purpose.

The purpose of this rule is to provide specific requirements for public drinking water storage tanks. It is intended to be applied in conjunction with other rules, specifically R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-545-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-545-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-545-4. General.

Storage for drinking water shall be provided as an integral part of each public drinking water system unless an exception to rule is approved by the Executive Secretary. Pipeline volume in transmission or distribution lines shall not be considered part of any storage volumes.

R309-545-5. Size of Tank(s).

Required Storage Capacity: In the absence of firm water use data, at or above the 90% confidence level, storage tanks shall be sized in accordance with the recommended minimums of R309-510.

R309-545-6. Tank Material and Structural Adequacy.

(1) Materials.

The materials used in drinking water storage structures shall provide stability and durability as well as protect the quality of the stored water. Steel tanks shall be constructed from new, previously unused, plates and designed in accordance with AWWA Standard D-100.

(2) Structural Design.

The structural design of drinking water storage structures shall be sufficient for the environment in which they are located. The design shall incorporate a careful analysis of potential seismic risks.

R309-545-7. Location of Tanks.

(1) Pressure Considerations.

The location of the reservoir and the design of the water system shall be such that the minimum working pressure in the

distribution system shall meet the minimum pressures as required in R309-105-9.

(2) Connections.

Tanks shall be located at an elevation where present and anticipated connections can be adequately served. System connections shall not be placed at elevations such that minimum pressures as required in R309-105-9 cannot be continuously maintained.

(3) Sewer Proximity.

Sewers, drains, standing water, and similar sources of possible contamination shall be kept at least 50 horizontal feet from the reservoir.

(4) Standing Surface Water.

The area surrounding a ground-level drinking water storage structure shall be graded in a manner that will prevent surface water from standing within 50 horizontal feet of the structure.

(5) Ability to Isolate.

Drinking water storage structures shall be designed and located so that they can be isolated from the distribution system. Storage structures shall be capable of being drained for cleaning or maintenance without necessitating loss of pressure in the distribution system.

(6) Earthquake and Landslide Risks.

Potential geologic hazards shall be taken into account in selecting a tank location. Earthquake and landslide risks shall be evaluated.

(7) Security.

The site location and design of a drinking water storage reservoir shall take into consideration security issues and potential for vandalism.

R309-545-8. Tank Burial.

(1) Flood Elevation.

The bottom of drinking water storage reservoirs shall be located at least three feet above the 100 year flood level or the highest known maximum flood elevation, whichever is higher.

(2) Ground Water.

When the bottom of a drinking water storage reservoir is to be below normal ground surface, it shall be placed above the local ground water table elevation.

(3) Covered Roof.

When the roof of a drinking water storage reservoir is to be covered by earth, the roof shall be sloped to drain toward the outside edge of the tank.

R309-545-9. Tank Roof and Sidewalls.

(1) Protection From Contamination.

All drinking water storage structures shall have suitable watertight roofs and sidewalls which shall also exclude birds, animals, insects, and excessive dust.

(2) Openings.

Openings in the roof and sidewalls shall be kept to a minimum and comply with the following:

(a) Any pipes running through the roof or sidewall of a

metal drinking water storage structure shall be welded, or properly gasketed. In new concrete tanks, these pipes shall be connected to standard wall castings with seepage rings which have been poured in place. Vent pipes, in addition[~~s~~] to seepage rings, shall have raised concrete curbs which direct water away from the vent pipe and are formed as a single pour with the roof deck. No roof drains or any other pipes which may contain water of less quality than drinking water shall ever penetrate the roof, walls, or floor of a drinking water storage tank.

(b) Openings in a storage structure roof or top, designated to accommodate control apparatus or pump columns, shall be welded, gasketed, or curbed and sleeved as above, and shall have additional proper shielding to prevent vandalism.

(c) Openings shall be kept as far away as possible from the storage tank outlet and other sources of surface water.

(3) Adjacent Compartments.

Drinking water shall not be stored or conveyed in a compartment adjacent to wastewater when the two compartments are separated by a single wall.

(4) Slope of Roof.

The roof of all storage structures shall be designed for drainage. Parapets, or similar construction which would tend to hold water and snow, shall not be utilized unless adequate waterproofing and drainage are provided. Downspout or roof drain pipes shall not enter or pass through the reservoir.

R309-545-10. Internal Features.

The following shall apply to internal features of drinking water storage structures:

(1) Drains.

If a drain is provided, it shall not discharge to a sanitary sewer. If local authority allows discharge to a storm drain, the drain discharge shall have a physical air gap of at least two pipe diameters between the discharge end of the pipe and the overflow rim of the receiving basin.

(2) Internal Catwalks.

Internal catwalks, if provided and located so as to be over the drinking water, shall have a solid floor with raised edges. The edges and floor shall be so designed that shoe scrapings or dirt will not fall into the drinking water.

(3) Inlet and Outlet.

To minimize potential sediment flow from the structure, the normal outlet pipes from all reservoirs shall be located in a manner to provide a silt trap prior to discharge into the distribution system.

(4) Disinfection.

If the drinking water reservoir is to be utilized as a contact basin for disinfection purposes, the design engineer shall conduct tracer studies or other tests, previously approved by the Executive Secretary, to determine the minimum contact time and the potential for short circuiting.

R309-545-11. ANSI/NSF International, Standard 61.

(1) ANSI/NSF Standard 61 Certification.

All interior surfaces or coatings shall consist of products which are certified by laboratories approved by ANSI and which comply with ANSI/NSF Standard 61 or other standards approved by the Executive Secretary. This requirement applies to any pipes and fittings, protective materials (e.g. paints, coatings, concrete admixtures, concrete release agents, concrete sealers), joining and sealing materials (e.g. adhesives, caulks, gaskets, primers and sealants) and mechanical devices (e.g. electrical wire, switches, sensors, valves, submersible pumps) which are located so as to come into contact with the drinking water.

(2) Curing Time and Volatile Organic Compounds.

If products which require a cure or set time are utilized in such a way as to come into contact with the drinking water, then water shall not be introduced into the vessel until any required curing time has passed. It shall be the responsibility of the water purveyor to assure that no tastes or odors, toxins or other compounds, which result in MCL exceedances, are imparted to the water as a result of tank repair.

R309-545-12. Steel Tanks.

(1) Paints.

Proper protection shall be given to all metal surfaces, both internal and external, by paints or other protective coatings. Internal coatings shall comply with ANSI/NSF Standard 61.

(2) Cathodic Protection.

If installed, internal cathodic protection shall be designed, installed and maintained by personnel trained in corrosion engineering.

R309-545-13. Tank Overflow.

All water storage structures shall be provided with an overflow which is discharged at an elevation between 12 and 24 inches above the ground surface with an appropriate air gap. The discharges shall not cause erosion.

(1) Diameter.

All overflow pipes shall be of sufficient capacity to permit waste of water in excess of the filling rate.

(2) Slope.

All overflow pipes shall Be sloped for complete drainage,

(3) Screen.

All overflow pipes shall be screened with No. 4 mesh non-corrodible screen installed at a location least susceptible to damage by vandalism,

(4) Visible Discharge.

All overflow pipes shall be located so that any discharge is visible,

(5) Cross Connections.

All overflow pipes shall not be connected to, or discharge into, any sanitary sewer system.

(6) Paint.

If an overflow pipe within a reservoir is painted or otherwise coated, such coating shall comply with ANSI/NSF Standard 61.

R309-545-14. Access Openings.

Drinking water storage structures shall be designed with reasonably convenient access to the interior for cleaning and maintenance.

(1) Height.

There shall be at least one opening above the water line which shall be framed at least four inches above the surface of the roof at the opening; or if on a buried structure, shall be elevated at least 18 inches above any earthen cover over the structure. The frame shall be securely fastened and sealed to the tank roof so as to prevent any liquid contaminant entering the tank. Concrete drinking water storage structures shall have raised curbs around access openings, formed and poured continuous with the pouring of the roof and sloped to direct water away from the frame.

(2) Shoebox Lid.

The frame of any access opening shall be provided with a close fitting solid shoebox type cover which extends down around the frame at least two inches and is furnished with a gasket(s) between the lid and frame,

(3) Locking Device.

The lid to any access opening shall have a locking device.

R309-545-15. Venting.

Drinking water storage structures shall be vented. Overflows shall not be considered as vents. Vents provided on drinking water storage reservoirs shall:

(1) Inverted Vent.

Be downturned or shielded to prevent the entrance of surface water and rainwater.

(2) Open Discharge.

On buried structures, have the discharge 24 to 36 inches above the earthen covering.

(3) Blockage.

Be located and sized so as to avoid blockage during winter conditions.

(4) Pests.

Exclude birds and animals.

(5) Dust.

Exclude insects and dust, as much as this function can be made compatible with effective venting.

(6) Screen.

Be fitted with No. 14 mesh or finer non-corrodible screen.

(7) Screen Protector.

Be fitted with additional heavy gage screen or substantial covering which will protect the No. 14 mesh screen against vandalism and, further, discourage purposeful attempts to contaminate the reservoir.

R309-545-16. Freezing Prevention.

All drinking water storage structures and their appurtenances, especially the riser pipes, overflows, and vents, shall be designed to prevent freezing which may interfere with proper functioning.

R309-545-17. Level Controls.

Adequate level control devices shall be provided to maintain water levels in storage structures.

R309-545-18. Security.

Locks on access manholes, and other necessary precautions shall be provided to prevent unauthorized entrance, vandalism, or sabotage.

R309-545-19. Safety.

(1) Utah OSHA.

The safety of employees shall be considered in the design of the storage structure. Ladders, ladder guards, platform railings, and safely located entrance hatches shall be provided where applicable. As a minimum, such matters shall conform to pertinent laws and regulations of the Utah Occupational Safety and Health Administration.

(2) Ladders.

Generally, ladders having an unbroken length in excess of 20 feet shall be provided with appropriate safety devices. This requirement shall apply both to interior and exterior reservoir ladders.

(3) Requirements for Elevated Tanks.

Elevated tanks shall have railings or handholds provided for transfer from the access tube to the water compartment.

R309-545-20. Disinfection.

Drinking water storage structures shall be disinfected before being put into service for the first time, and after being entered for cleaning, repair, or painting. The reservoir shall be cleaned of all refuse and shall then be washed with potable water prior to adding the disinfectant. AWWA Standard C652-02 [~~92~~] shall be followed for reservoir disinfection, with the exception there shall be no delivery of waters used in the disinfection process to the distribution system, unless specifically authorized, in writing, by the Executive Secretary.

Upon completing any of the three methods for storage tank chlorination, as outlined in AWWA C652-02 [~~92~~], the water system must properly dispose of residual super-chlorinated waters in the outlet pipes. Other super-chlorinated waters, which are not to be ultimately diluted and delivered into the distribution system, shall also be properly disposed.

Chlorinated water discharged from the storage tank shall be disposed of in an acceptable manner and in conformance with the rules of the Utah Water Quality Board (see R317 of the Utah Administrative Code).

R309-545-21. Incorporation by Reference.

The following list of Standards shall be considered as incorporated by reference in this specific rule. The most recent published copy of the referenced standard will apply in each case.

(1) AWWA Standards.

(a) C652-02 [~~92~~], Disinfection of Water Storage Reservoirs.

(b) D100-05 [~~96~~], Welded Steel Tanks for Water Storage.

(c) D101-53(R86), Inspecting and Repairing Steel Water Tanks, Standpipes, Reservoirs, and Elevated Tanks for Water Storage.

(d) D102-03 [~~97~~], Coating Steel Water-Storage Tanks.

(e) D103-97, Factory-Coated Bolted Steel Tanks for Water Storage.

(f) D104-01 [~~97~~], Automatically Controlled, Impressed-Current Cathodic Protection for the Interior of Steel Water Tanks.

(g) D110-04 [~~95~~], Wire-Wound Circular Prestressed-Concrete Water Tanks (including addendum D110a-96).

(h) D115-95, Circular Prestressed Concrete Water Tanks With Circumferential Tendons.

(i) D120-02 [~~84(R89)~~], Thermosetting Fiberglass-Reinforced Plastic Tanks.

(j) D130-02 [~~96~~], Flexible-Membrane-Lining and Floating-Cover Materials for Potable-Water Storage.

(2) NSF International Standards.

(a) NSF 60, Drinking Water Treatment Chemicals - Health Effects.

(b) NSF 61, Drinking Water System Components - Health Effects.

(3) Utah OSHA.

Applicable standards of the Utah Occupational Safety and Health Administration are hereby incorporated by reference.

R309-545-22. Operation and Maintenance of Storage Tanks.

(1) Inspection and Cleaning.

Tanks which are entered for inspection and cleaning shall be disinfected in accordance with AWWA Standard C652-02 [~~92~~] prior to being returned to service. When diver(s) enter storage tanks that have not been drained for inspection purposes, they shall comply with section five of the above standard unless the tank is constructed of steel, in which case they shall comply additionally with AWWA Standard D101-53(R86).

(2) Recoating or Repairing.

Any substance used to recoat or repair the interior of drinking water storage tank shall be certified to conform with ANSI/NSF Standard 61. If the tank is not drained for recoating or repairing, any substance or material used to repair interior coatings or cracks shall be suitable for underwater application, as indicated by the manufacturer, as well as comply with both ANSI/NSF Standards 60 and 61.

(3) Seasonal Use.

Water storage tanks which are operated seasonally shall be flushed and disinfected in accordance with AWWA Standard C652-02 [~~92~~] prior to each season's use. Certification of proper disinfection, as evidenced by at least one satisfactory bacteriologic sample, shall be obtained by the system management and kept on file for inspection by personnel of the Division. During the non-use period, care shall be taken to see that openings to the water storage tank (those which are normally closed and sealed during normal use) are closed and secured.

KEY: drinking water, storage tanks, access, overflow and drains
Date of Enactment or Last Substantive Amendment: March 8, 2006
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

R309. Environmental Quality, Drinking Water.
R309-550. Facility Design and Operation: Transmission and Distribution Pipelines.
R309-550-1. Purpose.

The purpose of this rule is to provide specific requirements for the design and installation of transmission and distribution pipelines which are utilized to deliver culinary drinking water to facilities of public drinking water systems or to consumers. It is intended to be applied in conjunction with rules R309-500 through R309-550. Collectively, these rules govern the design, construction, operation and maintenance of public drinking water system facilities. These rules are intended to assure that such facilities are reliably capable of supplying adequate quantities of water which consistently meet applicable drinking water quality requirements and do not pose a threat to general public health.

R309-550-2. Authority.

This rule is promulgated by the Drinking Water Board as authorized by Title 19, Environmental Quality Code, Chapter 4, Safe Drinking Water Act, Subsection 104(1)(a)(ii) of the Utah Code and in accordance with 63-46a of the same, known as the Administrative Rulemaking Act.

R309-550-3. Definitions.

Definitions for certain terms used in this rule are given in R309-110 but may be further clarified herein.

R309-550-4. General.

Transmission and distribution pipelines shall be designed, constructed and operated to convey adequate quantities of water at ample pressure, while maintaining water quality.

R309-550-5. Water Main Design.

(1) Distribution System Pressure.

The distribution system shall be designed to maintain minimum pressures as required in R309-105-9 (at ground level) at all points of connection, under all conditions of flow, but especially during peak day flow conditions, including fire flows.

(2) Assumed Flow Rates.

Flow rates to be assumed when designing or analyzing distribution systems shall be as given in R309-510 of these rules.

(3) Computerized Network Analysis.

(a) All water mains shall be sized after a hydraulic analysis based on flow demands and pressure requirements. If the calculations needed to conduct this hydraulic analysis are complex, a computerized network analysis shall be performed to verify that the distribution system will be capable of meeting the requirements of this rule.

(b) Where improvements will upgrade more than 50% of an existing distribution system, or where a new distribution system is proposed, a hydraulic analysis of the entire system shall be prepared and submitted for review prior to plan approval.

(c) In the analysis and design of water distribution systems, the following Hazen-William coefficients shall be used:

PVC pipe = 140; Ductile Iron Pipe = 120; Cement-Mortar Lined Ductile Iron Pipe = 130 to 140.

(4) Minimum Water Main Size.

For water mains not connected to fire hydrants, the minimum line size shall be 4-inch diameter. Minimum water main size serving a fire hydrant lateral shall be 8-inch diameter unless a hydraulic analysis indicates that required flow and pressures can be maintained by smaller lines.

(5) Fire Protection.

If a public water system is required to provide water for fire suppression by the local fire authority, or if the system has installed fire hydrants on existing distribution mains for that purpose:

(a) The design of the distribution system shall be consistent with Appendix B of the 2003 International Fire Code. As specified in this code, minimum fire-flow requirements are:

(i) 1000 gpm for one- and two-family dwellings with an area of less than 3600 square feet.

(ii) 1500 gpm or greater for all other buildings.

(b) The location of fire hydrants shall be consistent with Appendix C of the 2003 International Fire Code. As specified in this code, average spacing between hydrants must be no greater than 500 ft.

(c) An exception to the fire protection requirements of (a) and (b) may be granted if a suitable statement is received from the local fire protection authority.

(d) Water mains not designed to carry fire flows shall not have fire hydrants connected to them.

(e) The design engineer shall verify that the pipe network design permits fire-flows to be met at representative locations while minimum pressures as required in R309-105-9 are maintained at all times and at all points in the distribution system.

(f) As a minimum, the flows to be assumed during a fire-flow analysis shall be the "peak day demand" plus the fire flow requirement.

(6) Geologic Considerations.

The character of the soil through which water mains are to be laid shall be considered. This information shall accompany any submittal for a pipeline project.

(7) Dead Ends.

(a) In order to provide increased reliability of service and reduce head loss, dead ends shall be minimized by making appropriate tie-ins whenever practical.

(b) Where dead-end mains occur, they shall be provided with a fire hydrant if flow and pressure are sufficient, or with an approved flushing hydrant or blow-off for flushing purposes. Flushing devices shall be sized to provide flows which will give a velocity of at least 2.5 fps in the water main being flushed. No flushing device shall be directly connected to any sewer.

(8) Valves.

Sufficient valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than 500 foot intervals in commercial districts and at not more than one block

or 800 foot intervals in other districts. Where systems serve widely scattered customers and where future development is not expected, the valve spacing shall not exceed one mile.

(9) Corrosive Soils.

The design engineer shall consider the materials to be used when corrosive soils or waters will be encountered.

(10) Special Precautions in Areas of Groundwater Contamination by Organic Compounds.

Where distribution systems are installed in areas of groundwater contaminated by organic compounds:

(a) pipe and joint materials which are not subject to permeation of the organic compounds shall be used.

(b) non-permeable materials shall be used for all portions of the system including water main, service connections and hydrant [~~s~~] leads.

(11) Separation of Water Mains from Other Sources of Contamination.

Design engineers shall exercise caution when locating water mains at or near certain sites such as sewage treatment plants or industrial complexes. Individual septic tanks shall be located and avoided. The engineer shall contact the Division to establish specific design requirements for locating water mains near any source of contamination.

R309-550-6. Component Materials and Design.

(1) NSF Standard for Health Effects.

All materials which may contact drinking water, including pipes, gaskets, lubricants and O-Rings, shall be ANSI-certified as meeting the requirements of NSF Standard 61, Drinking Water System Components - Health Effects. To permit field-verification of this certification, all such components shall be appropriately stamped with the NSF logo.

(2) Restrictions on Asbestos and Lead.

(a) The use of asbestos cement pipe shall not be allowed.

(b) Pipes and pipe fittings containing more than 8% lead shall not be used. Lead-tip gaskets shall not be used. Repairs to lead-joint pipe shall be made using alternative methods.

(3) AWWA Standards for Mechanical Properties.

Pipe, joints, fittings, valves and fire hydrants shall conform to NSF Standard 61 or Standard 14, and applicable sections of ANSI/AWWA Standards C104-A21.4-03 [~~95~~] through C550-05 [~~90~~] and C900-07 [~~97~~] through C950-07 [~~95~~].

(4) Used Materials.

Only materials which have been used previously for conveying potable water may be reused. Used materials shall meet the above standards, be thoroughly cleaned, and be restored practically to their original condition.

(5) Fire Hydrant Design.

Hydrant drains shall not be connected to or located within 10 feet of sanitary sewers or storm drains.

(6) Air Relief Valves.

At high points in water mains where air can accumulate, provisions shall be made to remove air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in

situations where flooding may occur.

(a) Air Relief Valve Vent Piping.

The open end of an air relief vent pipe from automatic valves shall, where possible as determined by public water system management, be extended to at least one foot above grade and provided with a screened (#14 mesh, non-corrodible) downward elbow. Alternately, the open end of the pipe may be extended to as little as one foot above the top of the pipe if the valve's chamber is not subject to flooding and provided with a drain-to-daylight (See (b) below). Blow-offs or air relief valves shall not be connected directly to any sewer.

(b) Chamber Drainage.

Chambers, pits or manholes containing valves, blow-offs, meters, other such appurtenances to a distribution system, shall not be connected directly to any storm drain or sanitary sewer. They shall be provided with a drain to daylight. Where this is not possible, underground gravel filled absorption pits may be used if the site is not subject to flooding and conditions will assure adequate drainage. Where a chamber contains an air relief valve, and it is not possible to provide a drain-to-daylight, the vent pipe from the valve shall be extended to at least one foot above grade (See (a) above). Only when it is both impossible to extend the vent pipe above grade, and impossible to provide a drain-to-daylight may a gravel filled sump be utilized to provide chamber drainage (assuming local ground conditions permit adequate drainage without ground water intrusion).

R309-550-7. Separation of Water Mains and Transmission Lines from Sewers and Other Pollution Sources.

(1) Basic Separation Standards.

The horizontal distance between pressure water mains and sanitary sewer lines shall be at least ten feet. Where a water main and a sewer line must cross, the water main shall be at least 18 inches above the sewer line. Separation distances shall be measured edge-to-edge (i.e. from the nearest edges of the facilities). Water mains and sewer lines shall not be installed in the same trench.

(2) Exceptions to Basic Separation Standards.

Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by Subsection (1), above. Exceptions to the rule may be provided by the Executive Secretary if it can be shown that the granting of such an exception will not jeopardize the public health.

(3) Special Provisions.

The following special provisions apply to all situations:

(a) The basic separation standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions such as high groundwater exist.

(b) Sewer lines shall not be installed within 25 feet horizontally of a low head (5 psi or less pressure) water main.

(c) Sewer lines shall not be installed within 50 feet

horizontally of any transmission line segment which may become unpressurized.

(d) New water mains and sewers shall be pressure tested where the conduits are located ten feet apart or less.

(e) In the installation of water mains or sewer lines, measures shall be taken to prevent or minimize disturbances of the existing line.

(f) Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage which produces corrosive hydrogen sulfide.

(g) Sewer Force Mains

(i) Sewer force mains shall not be installed within ten feet (horizontally) of a water main.

(ii) When a sewer force main must cross a water line, the crossing shall be as close as practical to the perpendicular. The sewer force main shall be at least 18 inches below the water line.

(iii) When a new sewer force main crosses under an existing water main, all portions of the sewer force main within ten feet (horizontally) of the water main shall be enclosed in a continuous sleeve.

(iv) When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

(4) Water Service Laterals Crossing Sewer Mains and Laterals.

Water service laterals shall conform to all requirements given herein for the separation of water and sewer lines.

R309-550-8. Installation of Water Mains.

(1) Standards.

(a) The specifications shall incorporate the provisions of the manufacturer's recommended installation procedures or the following standards:

(i) AWWA Standard C600-05 [~~99~~], Installation of Ductile Iron Water Mains and Their Appurtenances

(ii) ASTM D2774, Recommended Practice for Underground Installation of Thermoplastic Pressure Piping and PVC Pipe

(b) The provisions of the following publication shall be followed for PVC pipe design and installation:

PVC Pipe - Design and Installation, AWWA Manual M23, 2002 [~~1990~~], published by the American Water Works Association

(2) Bedding.

A continuous and uniform bedding shall be provided in the trench for all buried pipe. Stones larger than the backfill materials described below shall be removed for a depth of at least six inches below the bottom of the pipe.

(3) Backfill.

Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. The material and backfill zones shall be as specified by the standards referenced in Subsection (1), above.

As a minimum:

(a) For plastic pipe, backfill material with a maximum particle size of 3/4 inch shall be used to surround the pipe.

(b) For ductile iron pipe, backfill material shall contain no stones larger than 2 inches.

(4) Dropping Pipe into Trench.

Under no circumstances shall the pipe or accessories be dropped into the trench.

(5) Burial Cover.

All water mains shall be covered with sufficient earth or other insulation to prevent freezing unless they are part of a non-community system that can be shut-down and drained during winter months when temperatures are below freezing.

(6) Thrust Blocking.

All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement.

(7) Pressure and Leakage Testing.

All types of installed pipe shall be pressure tested and leakage tested in accordance with AWWA Standard C600-99.

(8) Surface Water Crossings.

(a) Above Water Crossings

The pipe shall be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement.

(b) Underwater Crossings

A minimum cover of two feet or greater, as local conditions may dictate, shall be provided over the pipe. When crossing water courses which are greater than 15 feet in width, the following shall be provided:

(i) The pipe shall be of special construction, having restrained joints for any joints within the surface water course and flexible restrained joints at both edges of the water course.

(ii) Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible, and not subject to flooding; and the valve nearest to the supply source shall be in a manhole.

(iii) Permanent taps shall be made on each side of the valve within the manhole to allow insertion of testing equipment to determine leakage and for sampling purposes.

(9) Sealing Pipe Ends During Construction.

The open ends of all pipeline under construction shall be covered and effectively sealed at the end of the day's work.

(10) Disinfecting Water Distribution Systems.

All new water mains or appurtenances shall be disinfected in accordance with AWWA Standard C651-05 [~~99~~]. The specifications shall include detailed procedures for the adequate flushing, disinfection and microbiological testing of all water mains. On all new and extensive distribution system construction, evidence of satisfactory disinfection shall be provided to the Division. Samples for coliform analyses shall be collected after disinfection is complete and the system is refilled with potable water. A standard heterotrophic plate count is advisable. The

use of water for culinary purposes shall not commence until the bacteriologic tests indicate the water to be free from contamination.

R309-550-9. Cross Connections and Interconnections.

(1) Physical Cross Connections.

There shall be no physical cross connections between the distribution system and pipe, pumps, hydrants, or tanks which are supplied from, or which may be supplied or contaminated from, any source except as approved by the Executive Secretary.

(2) Recycled Water.

Neither steam condensate nor cooling water from engine jackets or other heat exchange devices shall be returned to the potable water supply.

(3) System Interconnects.

The approval of the Executive Secretary shall be obtained for interconnections between different potable water supply systems.

R309-550-10. Water Hauling.

Water hauling is not an acceptable permanent method for culinary water distribution in community water systems. Proposals for water hauling shall be submitted to and approved by the Executive Secretary.

(1) Exceptions.

The Executive Secretary may allow its use for non-community public water supplies if:

(a) consumers could not otherwise be supplied with good quality drinking water, or

(b) the nature of the development, or ground conditions, are such that the placement of a pipe distribution system is not justified.

(2) Emergencies.

Hauling may also be necessary as a temporary means of providing culinary water in an emergency.

R309-550-11. Service Connections and Plumbing.

(1) Service Taps.

Service taps shall be made so as to not jeopardize the sanitary quality of the system's water.

(2) Plumbing.

(a) Service lines shall be capped until used.

(b) Water services and plumbing shall conform to the Utah Plumbing Code. Solders and flux containing more than 0.2% lead and pipe and pipe fittings containing more than 8% lead shall not be used.

(3) Individual Home Booster Pumps.

Individual booster pumps shall not be allowed for any individual service from the public water supply mains. Exceptions to the rule may be provided by the Executive Secretary if it can be shown that the granting of such an exception will not jeopardize the public health.

(4) Service Lines.

The portion of the service line under the control of the water supplier is considered to be part of the distribution system

and shall comply with all requirements given herein.

(5) Service Meters and Building Service Line.

Connections between the service meter and the home shall be in accordance with the Utah Plumbing Code.

(6) Allowable Connections.

All dwellings or other facilities connected to a public water supply shall be in conformance with the Utah Plumbing Code.

R309-550-12. Transmission Lines.

(1) Unpressurized Flows.

Transmission lines shall conform to all applicable requirements in this rule. Transmission line design shall minimize unpressurized flows.

(2) Proximity to Concentrated Sources of Pollution.

A water supplier shall not route an unpressurized transmission line any closer than fifty feet to any concentrated source of pollution (i.e. septic tanks and drain fields, garbage dumps, pit privies, sewer lines, feed lots, etc.). Furthermore, unpressurized transmission lines shall not be placed in boggy areas or areas subject to the ponding of water.

(3) Exceptions.

Where the water supplier cannot obtain a fifty foot separation distance from concentrated sources of pollution, it is permitted to use a Class 50 ductile iron pipe with joints acceptable to the Executive Secretary. Reasonable assurance must be provided to assure that contamination will not be able to enter the unpressurized pipeline.

R309-550-13. Operation and Maintenance.

(1) Disinfection After Line Repair.

The disinfection procedures of Section 4.7, AWWA Standard C651-05 [~~99~~] shall be followed if any water main is cut into or repaired.

(2) Cross Connections.

The water supplier shall not allow a connection which may jeopardize water quality. Cross connections are not allowed unless controlled by an approved and properly operating backflow prevention assembly. The requirements of the Utah Plumbing Code shall be met with respect to cross connection control and backflow prevention.

Suppliers shall maintain an inventory of each pressure vacuum breaker assembly, spill-resistant vacuum breaker assembly, double check valve assembly, reduced pressure principle backflow prevention assembly, and high hazard air gap used by their customers, and a service/inspection record for each such assembly.

Backflow prevention assemblies shall be inspected and tested at least once a year, by an individual certified for such work. This responsibility may be borne by the water system or the water system management may require that the customer having the backflow prevention assembly be responsible for having the device tested.

Suppliers serving areas also served by a pressurized irrigation system shall prevent cross connections between the two. Requirements for pressurized irrigation systems are outlined in

Section 19-4-112 of the Utah Code.

(3) NSF Standards.

All pipe and fittings used in routine operation and maintenance shall be ANSI-certified as meeting NSF Standard 61 or Standard 14.

(4) Seasonal Operation.

Water systems operated seasonally shall be disinfected and flushed according to the techniques given in AWWA Standard C651-05 [~~99~~] for pipelines and AWWA Standard C652-02 [~~92~~] for storage facilities prior to each season's use. A satisfactory bacteriologic sample shall be achieved prior to use. During the non-use period, care shall be taken to close all openings into the system.

KEY: drinking water, transmission and distribution pipelines, connections, water hauling
Date of Enactment or Last Substantive Amendment: March 8, 2006
Notice of Continuation: April 2, 2007
Authorizing, and Implemented or Interpreted Law: 19-4-104

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AGENDA ITEM 8

IPS VIOLATION POINTS – Patti Fauver

IMPROVEMENT PRIORITY SYSTEM RULE

Administrative Rule: R309-400 [~~150~~]
Implementation Policy

Overview: The purpose of this document is to set forth the intent of the Board in adopting this rule and set forth direction to staff on its implementation. The basic intent of this rule is to provide a concise summary to public drinking water systems on the status of their compliance with the Board's rules. Further, the report aspect of implementation will allow operators and managers of water systems to prioritize actions they can take to improve the quality, safety and reliability of their water system.

Objectives: This rule is intended to achieve the following objectives:

1. To increase awareness amongst public drinking water system owners and managers of the Board's rules as well as actions water systems can take to improve their water systems and safeguard the health of water users.
2. To help city/town councils, board of directors or similar responsible parties or entities to prioritize needed improvements.
3. Promote a dialogue between owners and operators of public drinking water systems and the Division of Drinking Water staff on the importance and necessity of identified actions.
4. Make the Board's rating system more meaningful and responsive to all of the Board's rules.
5. Identify, in an equitable manner: a) the recalcitrant systems needing further enforcement to gain compliance and b) those systems deserving of recognition for a job well done.

Implementation: The Division will implement R309-400 [~~150~~] as follows:

1. Staff will review the ratings of every public drinking water system on a scheduled calendar quarter basis and appropriately change the rating of water systems consistent with the rule.
2. Staff will change the rating of any system at any time, either up or down when presented with documentation to justify the change.
3. Staff will distribute to every system at least annually a copy of their Improvement Priority Report, and distribute to any system or individual the same report for a specific system upon request.
4. ~~[The report portion of this rule (see implementation #3 above) would be issued using the following direction: For systems rated "Approved" the report would list the rating and non compliance issues related with the system in priority order – no point value will be listed for the identified issues. For systems rated "Corrective Action" or "Not Approved" the non compliance issues would be listed along with the identified point value.]~~

5. Staff will [~~generally~~] not assess points on construction which has received an exception to rule for the issue in question.[~~grandfathered construction ("grandfathered construction" means construction which was in conformance with applicable rules at the time of construction, but which does not comply with current rules). An exception to this would be the circumstance where the existing condition represents a clear and imminent health hazard.~~]
6. Upon discovery of physical deficiencies, staff and the management of the water system would agree on a sufficient amount of time to correct the identified deficiencies before the priority points would be assessed to a system and before such assessment could cause a change in the system's rating.
7. Except as noted in the Rule itself, priority points for physical facilities will be assessed on an issue basis rather than on an occurrence basis. That is where the same issue exists on several facilities for the same water system, priority points will be assessed on the issue and not for each facility.

Board Adopted _____

Improvement Priority System (IPS)
Points for Chemical Monitoring Violations

Revision of Current Demerit Point Application Policies

Upon adoption of R309-400 in 1995 (originally R309-150), the Drinking Water Board adopted two implementation policies. Staff would like the Board to reconsider three of these policies:

> Policy #4: The report portion of this rule (see implementation #3 above) would be issued using the following direction: For systems rated "Approved" the report would list the rating and non compliance issues related with the system in priority order – no point value will be listed for the identified issues. For systems rated "Corrective Action" or "Not Approved" the non compliance issues would be listed along with the identified point value.
>
> Policy #5: Staff will generally assess points on grandfathered construction ("grandfathered construction" means construction which was in conformance with applicable rules at the time of construction, but which does not comply with current rules). An exception to this would be the circumstance where the existing condition represents a clear and imminent health hazard.
>
> Policy #7: Except as noted in the Rule itself, priority points will be assessed on an issue basis rather than on an occurrence basis. That is where the same issue exists on several facilities for the same water system, priority points will be assessed on the issue and not for each facility.

Implementation Issue #4: This policy has not been followed for the last several years due to software changes, the complexity of tracking all the issues and ultimately merging them into a single report. These issues have made this policy un-workable. As such, the Division would like to remove it as one of the implementation policies.

Implementation Issue #5: The Division and its surveyors have tried to follow this implementation directive; however, due to different skill sets among surveyors, lack of documentation and other factors, the Division has ended up with very inconsistent implementation. In recent years, surveyors have been asked to report all construction deficiencies and to direct the water system to officially request an "exception to rule" through the Engineering Section. In this manner, water systems can document the deviation in construction standards one time, it can be reviewed and if approved recorded and then be made available to the surveyor for subsequent system surveys.

Implementation Issue #7: The Division has implemented the single issue policy to include chemical monitoring, although, it appears in the text to mainly be focused on the physical facilities.

Currently, a system may have multiple sources delinquent for sampling and receive only one application of the demerit points. Further, the system may be delinquent in sampling over multiple compliance periods and still only receive one application of the points.

This creates a problem when systems with monitoring issues escalate in EPA's attention, but never attain sufficient IPS points to focus the Division's attention to. Many of EPA's significant non-complier (SNC) systems do not appear on the Divisions priority list of systems and do not receive timely technical assistance until the rise to EPA's list. The Division would like to reverse this so that, the systems show up on our lists prior to becoming EPA targets.

The text of the rule states: "The chemical assessments shall be updated on a quarterly basis with the total number of points reflecting the most recent compliance period unless otherwise specified." The IPS report specifies each violation and the compliance period listed.

Staff Recommendation:

Staff recommends the Drinking Water Board approve the attached revisions to the Improvement Priority System Rule, Implementation Policy.